

MR
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Metropolitan Road
Improvement Alliance

Annual Condition Report

Drainage Monitoring and Management Plan

Ministerial Statement 1008

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EXECUTIVE SUMMARY

This report is the summary of results collected and assessed under the Drainage Monitoring and Management Plan (DMMP) for the period 2 July 2017 to 1 July 2018. The DMMP requires that groundwater at specified locations be monitored to ensure that works undertaken as part of the Roe 8 Highway Extension (the Project) do not negatively impact groundwater levels or quality beneath the site.

Overall, results of analytes assessed over the monitoring period are generally compliant with the Guideline trigger values outlined in the DMMP. There were occasional fluctuations in the data outside the trigger levels and these are attributable to natural variations.

Four groundwater monitoring locations have consistently reported pH results below the lower limit of the baseline trigger. Due to the consistency of the reported concentrations at these locations, these results are considered to be representative of 'natural variations' as per recommendations in the Baseline Study. These exceedances are small in scale, with the majority of the recorded values falling below the baseline, and may relate to seasonal influences on the groundwater at this location. Considering that the drainage basins are yet to be constructed it could be considered that the data collected represents baseline data.

Minor exceedances of total dissolved solids also occurred at two of the monitored locations; results which are also viewed as part of natural variation for the site, due to the regularity of fluctuations above and below the guidelines both before and after construction commenced.

Dissolved metals concentrations such as aluminium, iron, nickel, copper and zinc also occasionally exceeded above the associated DMMP guidelines for multiple bores. All dissolved metal exceedances were minor in nature and are attributed to natural variation on a per bore basis, due to the minor nature of the exceedance, sporadic occurrence and the subsequent return of concentrations below trigger values in follow-up monitoring events.

Nutrients such as nitrate, ammonia and phosphorus appeared to fluctuate on a seasonal basis, with some bores reporting concentrations above the guidelines consistently both before and after the project construction date.

As the drainage basins have not been constructed, the data collected thus far is considered to be additional baseline data. Additionally, due to changes to the original construction footprint, some of the drainage basins will not be constructed. As such, it is recommended that the Guidelines are updated to reflect the project changes and footprint and to include the additional baseline information. In particular, it is recommended that the baseline trigger values for nutrients such as ammonia, nitrate and phosphorus are updated to better reflect natural conditions.

1 INTRODUCTION

This Annual Report summarises the results and compliance of the Roe 8 Highway Extension (the Project) against the Roe Highway Extension Drainage Monitoring and Management Plan (DMMP). This report has been prepared for the purpose of meeting Condition 8-2 and 8-3 in Ministerial Statement 1008 (MS 1008). The conditions require Main Roads to monitor the quality and levels of groundwater and the condition of the constructed drainage basins. Main Roads must then take management action in the event that the Project and/or stormwater treatment impacts the groundwater quality.

This report addresses the 12 month reporting period from the 2 July 2017 to 1 July 2018, but also includes previous data to help characterise ground and surface water conditions. Due to variation to the original planned design, the drainage basins have not currently been constructed. As a result, this report has been produced whilst technically still in the baseline data collection phase.

Main Roads Western Australia is generally compliant with conditions under MS1008 for the period addressed in the annual report.

1.1 Objectives

The main objective of the program, as outlined in the DMMP, is to demonstrate that groundwater quality is being maintained relative to pre-construction conditions. The program objective aligns with the overarching objective of the Environmental Protection Authority (EPA) for this project, which is to:

“Maintain the quality of groundwater and surface water, sediment and biota so that the environmental values, both ecological and social, are protected.”

Groundwater monitoring locations required for monitoring in the MS 1008 are located upgradient and downgradient of key planned drainage basins (Basins G, I, L and K). These locations were monitored for parameters using methodologies which are consistent with the baseline monitoring program.

A Baseline Analysis Report (BAR) was conducted by Aurecon from September 2015 to August 2016, to develop localised trigger levels for groundwater quality and water levels. Ongoing data collected throughout the monitoring program will be used to further refine local trigger and guideline values as per the DMMP. The purpose of ongoing monitoring is to inform, through triggers, if the environmental objective is being achieved, and if contingency management actions need to be implemented or revised.

This report has been prepared to address the requirements under Condition 8 of the MS 1008, dated 2 July 2015, and is summarised below in Table 1-1.

Table 1-1 Condition 8 requirements under MS 1008 for Annual Condition Report

Condition	Requirement	Section
8-1	The proponent shall ensure that impacts to groundwater quality from the ongoing operation of the proposal are maintained relative to pre-construction conditions established in baseline surveys required by condition 8-3.	DMMP
8-2	Prior to commencement of construction, the proponent shall prepare a Drainage Management and Monitoring Plan to the requirements of the CEO, on advice of the Department of Water. The Drainage Management and Monitoring Plan shall:	N/A
	1. when implemented, substantiate whether condition 8-1 is being met	DMMP
	2. identify the locations, capacity and dimensions of bio retention and infiltration basins consistent with the Water Management Strategy (AECOM) dated 16 January 2013	Appendix 2, Figure 2 & Figure 3 (DMMP)
	3. include ongoing maintenance measures to ensure the bio retention and infiltration basins are performing effectively	Section 3.1 (DMMP)

Condition	Requirement	Section
	4. include protocols and procedures for baseline monitoring of groundwater levels and groundwater quality	Section 2 & Appendix 4 (DMMP)
	5. include protocols and procedures for monitoring contaminant and nutrient levels within the bio retention and infiltration basins	Section 2 (DMMP)
	6. include protocols, procedures and locations for monitoring contaminants and nutrient levels of groundwater upstream and downstream of the bio retention and infiltration basins	Section 2, Figure 2 & Figure 4 (DMMP)
	7. identify criteria to trigger implementation of management measures to remediate contaminants within the bio retention and infiltration basins and ensure the basins are performing effectively	Section 2 (DMMP)
	8. include management measures referred to in condition 8-2(7)	Section 2 (DMMP)
	9. determine the timing and frequency of reporting to the CEO.	Section 4 (DMMP)
8-3	Prior to commencement of construction, the proponent shall implement the approved Drainage Management and Monitoring Plan in order to collect baseline data and continue implementation until otherwise agreed by the CEO.	Section 1 (DMMP)
8-4	The proponent may review and revise the Drainage Management and Monitoring Plan to the requirements of the CEO.	Section 4 (DMMP)
8-5	The proponent shall review and revised the Drainage Management and Monitoring Plan as and when directed by the CEO.	Section 4 (DMMP)
8-6	The proponent shall implement the approved revisions of the Drainage Management and Monitoring Plan required by conditions 8-4 and 8-5.	Section 4 (DMMP)
8-7	The Drainage Management and Monitoring Plan required by condition 8-2 shall be made publically available in a manner approved by the CEO.	Section 4.4 (DMMP)

1.2 Scope of Work

Prior to construction commencement, Aurecon (2016) developed a baseline analysis report (BAR) conducted from September 2015 to August 2016. The BAR identified localised trigger levels and ranges for water quality parameters and analytes of concern (AOC) from this 12 month baseline period, which were then used to inform the DMMP (Strategen 2016). The majority of the baseline trigger levels developed for the DMMP were based on previously collected baseline and reference data. Where reference and baseline information was not available, the Australian and New Zealand Environment and Conservation Council (ANZECC) 2000 or National Environmental Protection Council (NEPC 1999) guidelines were assigned for that analyte.

Condition 8-4 of the MS 1008 states that Main Roads may amend trigger values as the Project progresses. The DMMP (Strategen 2016) advises that ongoing data collected pre-construction may be used to refine baseline trigger values and ranges.

The purpose of the monitoring is to determine, through comparison against triggers, if groundwater water quality and levels are impacted by the Project. The DMMP requires that water quality parameters are monitored monthly, unless the frequency is revised following the first year of monitoring. Laboratory analysis of AOC will be undertaken quarterly during construction, then six-monthly post-construction. Parameters and AOCs to be reported are as listed in Section 2 (Table 3) of the DMMP (Strategen 2016).

1.2.1 Monitoring Locations

The DMMP (Strategen 2016) provides exact locations and figures for each of the monitoring sites. The groundwater bores identified in the DMMP are listed in Table 1-2.

Table 1-2 Groundwater bores selected for monitoring in the DMMP

Bore ID	Description
D1	Upgradient (Basin L)
D2	Downgradient (Basin L)
GW-D3	Upgradient (Basins F and G)
GW-D4	Downgradient (Basins F and G)
GW-D5	Upgradient (Basin I)
GW-D7	Downgradient (Basin I)
GW-D8	Upgradient (Basin K)
GW-T3E-A	Downgradient (Basin K)

1.2.2 Applied Guidelines

The results were compared against the baseline trigger level and reference ranges as defined in the DMMP (Strategen 2016) and the BAR (Aurecon 2016). 'The Guidelines' will be used to refer collectively to those values outlined in the DMMP. The Guidelines were developed as defined above in Section 1.2

If monitoring indicates that the specified trigger criteria may have been exceeded, additional appropriate actions are required (as outlined in the DMMP). Interpretation of the results is guided by Section 4 of the BAR (Aurecon 2016). The BAR outlines how to apply the baseline trigger levels given various possible scenarios which are presented in Table 1-3.

Table 1-3 Potential scenarios that may occur (Aurecon 2016)

Scenario	Definition
Natural Variation	Using the 80 th and 20 th percentiles, it is inevitable that small exceedances will be experienced on a semi-regular basis as part of 'natural variation'.
Sharp Rises or Falls	Sharp rises or falls in data points may be of concern. Measurements should be re-taken as soon as practicably possible to determine if there has been a contamination event.
Concerning Trends	Consistent rises or falls in water quality results over time may indicate a potential chronic contamination event. If such trends do occur (e.g. five consecutive points or more), then cause investigations should begin.
Seasonal Variation	Surface water bodies that are subject to periodical wetting and drying due to seasonal weather patterns are likely to be subject to oscillation in analyte concentrations due to the effects of changes in water body volume (i.e. periods of concentration and dilution).

1.3 Local Climate and Rainfall

The Project is located in the southwest of Western Australia, which experiences a Mediterranean climate; characterised by warm to hot dry summers and mild to cool wet winters. The climate in Western Australia is a result of the Indian Ocean High, a high pressure cell that shifts towards the poles in summer and the equator in winter; playing a major role in the formation of the deserts of Western Australia and the Mediterranean climate of the southwest. Precipitation predominantly occurs during winter months, with the possibility of summer storms.

The nearest Bureau of Meteorology (BoM) weather station is Jandakot Aero station 009172.

Jandakot Aero station has recorded an average annual rainfall of 823.5 mm since 1972, with the majority of rainfall occurring between May and August (Figure 1-1 [BoM, 2018]). February 2017 and January 2018 both experienced a significantly larger than average rainfall event, whilst February and March in 2018 received much less than average. The groundwater levels measured at the bores, compared with the associated rainfall data is covered in **Section 3.1**.

Average maximum temperatures peak between December and February and coincide with low rainfall averages (BoM, 2017).

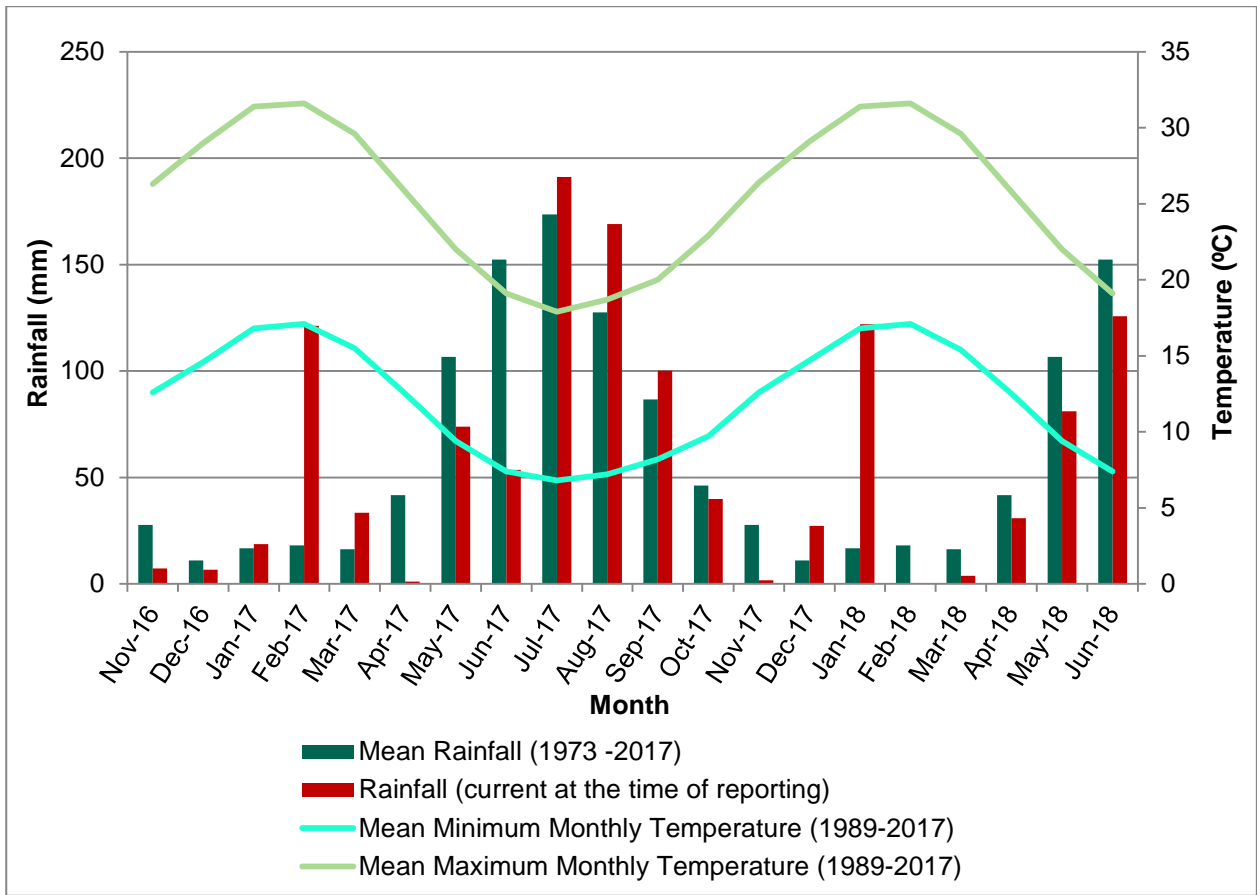


Figure 1-1 - Jandakot Aero Station 009172 Climate Data (BoM, 2018)

2 METHODOLOGY

2.1 Safety Planning

All works were completed in accordance with an approved Project Specific Health and Safety Plan, detailing the following:

- Site induction process;
- Environmental monitoring and management protocols;
- Safe Work methods;
- Contingency plans and procedures;
- Exclusion zones;
- Decontamination procedures;
- Pre-defined site routes and access points.

Water monitoring was conducted on- and off-site; consisting of 8 groundwater monitoring locations. The groundwater bores were gauged, purged and sampled using low-flow techniques.

2.2 Field work

2.2.1 Gauging and Sampling

Details of the sampling methodology employed in the field are summarised below:

Table 2-1 Field Methodology

Activity/Item	Details
Groundwater Bore Gauging	All monitoring bores were gauged using an interface probe to determine the depth to groundwater prior to the commencement of purging and the total depth of the bore following sampling. Groundwater gauging recorded information is presented in Appendix A .
Bore Purging and Sampling Method	All bores were sampled using low-flow technique (peristaltic pump), with the exception of GW-D8 which was sampled using micro-purging (bladder pump). The inlet of the peristaltic pump was positioned with approximately at least 0.5-1 m of water above. Ex-situ measurements to determine groundwater quality; pH, dissolved oxygen (DO), redox potential (redox), temperature and electrical conductivity (EC) were conducted on site using a multi-parameter instrument (YSI Pro DSS) fitted with a flow-through-cell. Total dissolved solids (TDS) is approximated from electrical conductivity, by the assumption that $TDS \approx EC \times 0.65$, if $EC < 12,000 \mu/cm$. Field parameters are presented in tabulated form in Appendix A .
Surface Water Sampling Method	In-situ measurements of groundwater pH, dissolved oxygen (DO), redox potential (redox), temperature, electrical conductivity (EC) and (Nephelometric Turbidity Units) NTU were conducted using a multi-parameter instrument (YSI Pro DSS), and were profiled at different depths if water level permitted. Field parameters are presented in tabulated form in Appendix A .
Sample Analysis	Primary samples were analysed by ALS, a NATA accredited laboratory, using standard methods. Laboratory QA/QC measures included one rinsate sample for each day monitoring, as well as a duplicate sample for GW-T3E-A
Field Documentation	All field records were logged on standardised field forms and included the date and time, location, field personnel, quality assurance / quality control (QA/QC) sample information and details of the sampling observations, in Appendix B .
Sample Preparation, Preservation and Transportation	Samples were placed in laboratory-supplied bottles containing appropriate preservatives. Samples were labelled in accordance with the bore location and date, placed in eskies chilled with ice and forwarded to the laboratory under standard chain of custody (COC) procedures. Copies of the laboratory documentation are presented in Appendix C .
Decontamination Procedure	Decontamination of all non-disposable equipment was completed between sample locations, with dedicated plastic tubing utilised for each bore. Disposable equipment such as bladders and gloves were replaced between each location.
Equipment Calibration	All field equipment was calibrated by field staff prior to use on-site. Calibration reports for all equipment are provided in Appendix D .

2.3 Data Assessment Methodology

The parameters of total dissolved solids (TDS) and corrected redox (redox) were calculated by MRIA personnel based on the field measurements taken for electrical conductivity (EC) and redox potential. These parameters are included in the field results table of Appendix A.

Data from field sheets were reviewed immediately to determine whether results exceeded the guideline parameters. Where potential exceedances were noted, contingency actions (re-sampling within a four week period) were undertaken. The data was reviewed and compared with previous results to determine where concerning trends were evident. If data was consistent with previous results or a one off spike, it was not deemed an exceedance and was not reported further.

2.4 Variations

The program was generally compliant with conditions in the MS 1008 and the DMMP; however variations due to conditions outside of the project control/scope are listed below in Table 2-2.

Table 2-2 Variations from WMMP

	Obligation	Variation
1	Secondary parameters – Total acidity, total alkalinity and major anions and cations (annually – in October)	Was not completed in October 2017 for groundwater or surface water.
2	Sampling not completed at all groundwater bores	One bore listed in this program is no longer in use, GW-D7, due to limestone rocks blocking the bore. The last monitoring round for this bore was undertaken in December 2017.

3 GROUNDWATER RESULTS

3.1 Groundwater Gauging

Groundwater gauging and rainfall data (BoM 2018) is presented in Figure 3-1. Groundwater level is displayed inversely, as metres below top of casing (mBTC). An increase in water level is presented as a measurement closer to 0 m than the previous recording.

Based on Figure 3-1, groundwater levels are relatively stable, with peaks and troughs correlating with rainfall events. This indicates that groundwater in this region is significantly influenced by seasonal fluctuations.

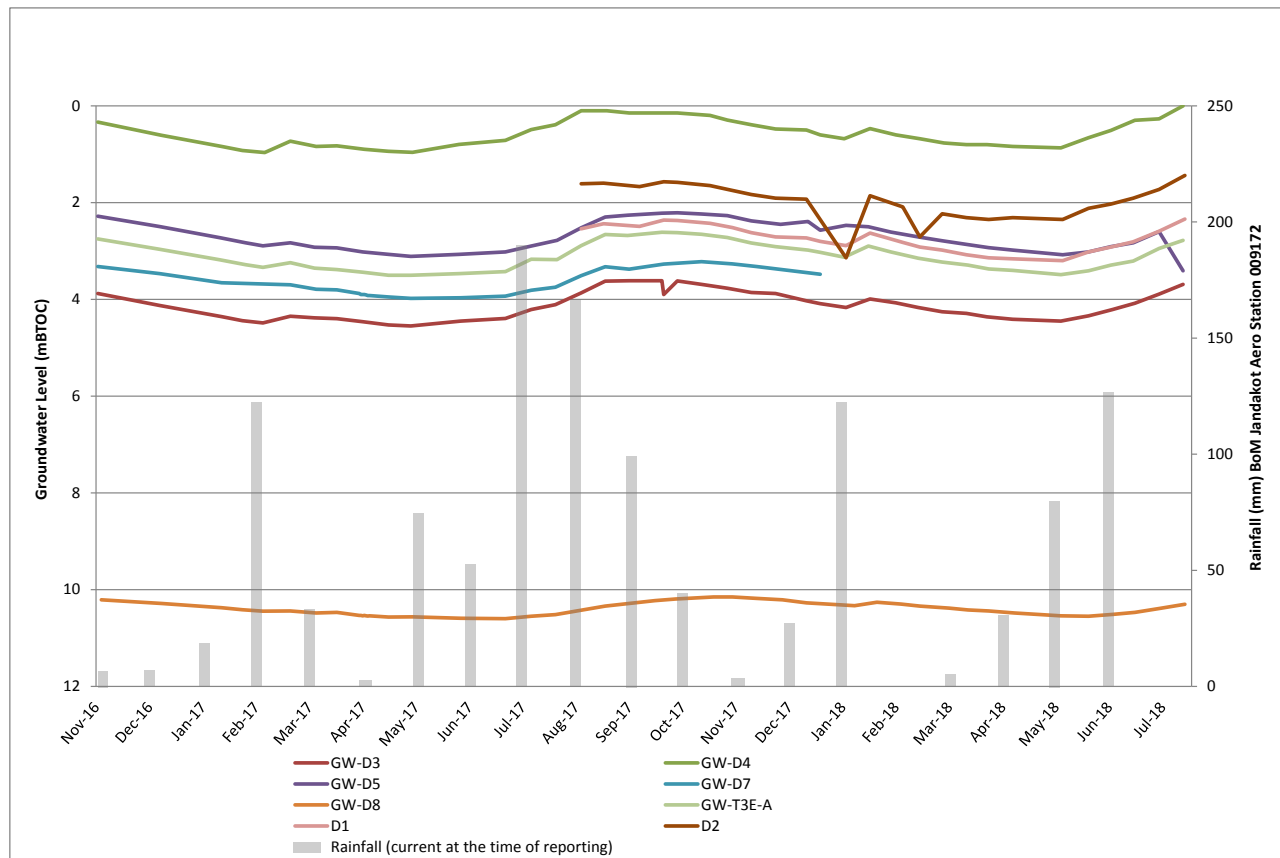


Figure 3-1 - Impact Groundwater Levels and Rain Gauge Data (BoM 2018)

3.2 Water Quality Parameters

3.2.1 Summary

Stabilised groundwater field parameters, measured on a fortnightly basis, are presented in **Table 1** (attached) and are summarised below:

1. Water temperatures were relatively stable throughout the 12 month monitoring period, with bores trending towards lower temperatures throughout winter and spring, and higher temperatures throughout summer and autumn. The lowest recorded temperature was reported in August 2017 at 17.2 °C, with the highest recorded in March/April 2018 at 22.8 °C across multiple locations.
2. pH was largely consistent throughout the reporting period with a recorded range of 4.65 (June 2018, GW-T3E-A) to 7.44 (August 2017, GW-D7), indicating overall neutral conditions; with some bores inclined to slightly acidic to neutral conditions (GW-T3E-A).
3. Total Dissolved Solids (TDS), as derived from electrical conductivity (EC), ranged from 109.85 mg/L (August 2017, GW-D4) to 1386 mg/L (July 2017, GW-D7). The recorded values were largely consistent for each individual bore, with TDS values on average indicating freshwater conditions. Trends show a general decrease in TDS throughout autumn/winter and a slight increase throughout the spring/summer months.

- Dissolved Oxygen (DO) was also relatively consistent for each individual bore for the 12 month reporting period, with the lowest recorded at 0.13 mg/L (October 2017, D1) and highest in September 2017 at 6.23 mg/L (GW-D7).
- Corrected redox was similarly consistent across the majority of individual bores, with a reported range from -55.7 (August 2017, D1) to 384 (August 2017, D1). These values indicate that groundwater across the area is moderately reducing in nature.

Analytes which reported values outside of the guidelines are further discussed in the sections below.

3.2.2 pH

The pH results were assessed against the trigger levels defined in the DMMP, which gives a pH range of 5.6 – 7.5. Figure 3-2 displays results for all ‘downgradient’ and ‘upgradient’ bores. It is noted however, that at this time the planned drainage basins which would fall between the ‘downgradient’ and ‘upgradient’ bores have not been constructed.

The red shaded areas of the graphs indicate results recorded outside of the Guidelines.

Four groundwater monitoring locations have consistently reported pH results below the lower limit of the baseline trigger. These include GW-T3E-A, GW-D5, GW-D3 and D1; of which, three are ‘upgradient’ bores. The results from these bores are therefore considered to be representative of natural conditions within the bore, as each individual bore presents largely stable results over the monitoring period.

pH is noted to fluctuate within each bore both prior to and following construction commencement, identified in the graph below. Therefore work to date undertaken by the Project in the surrounding area is not considered to have impacted pH within the groundwater.

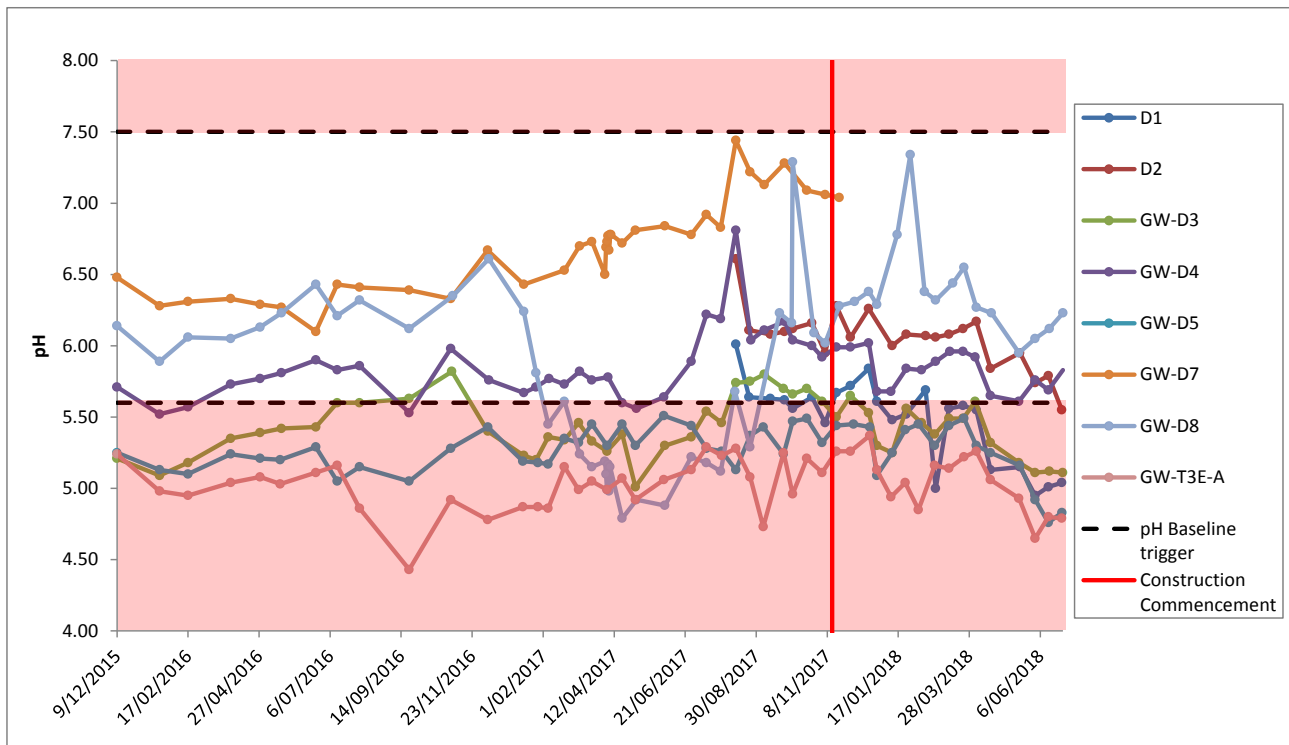


Figure 3-2 - pH results at all ‘upgradient’ and ‘downgradient’ bores

3.2.3 EC and TDS

EC (field measured) and TDS (calculated values based on EC) for all bores were assessed against the guidelines. All bores except GW-D7 and GW-D8 were consistently below the guidelines. GW-D7 exceeded on most sampling events for both EC and TDS, with EC results shown in Figure 3-3 below.

The pink shaded area shown in Figure 3-3 illustrates EC values recorded above the Guidelines for both bores. As can clearly be seen below, GW-D7 consistently reported EC values above this trigger limit, demonstrating that the natural condition for this bore is slightly more saline than the EC baseline trigger level. The small number of exceedances visible in the data for GW-D8 can be attributed to 'natural variation' as is outlined in the BAR. These exceedances are small in scale, with the majority of the recorded values falling below the baseline, and may relate to seasonal influences on the groundwater at this location.

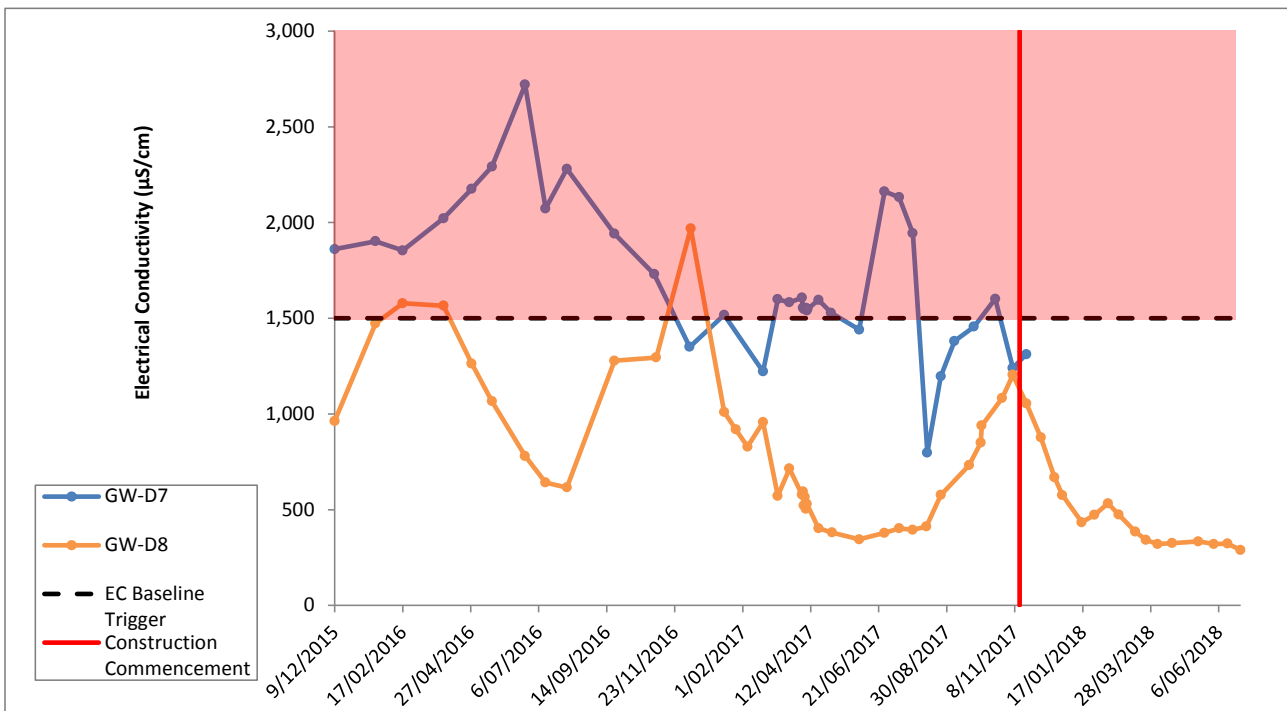


Figure 3-3 - EC at GW-D7 and GW-D8

3.3 Analytical Results

3.3.1 TRH/BTXN

The majority of results from petroleum hydrocarbon and BTEXN analytes were below the laboratory limit of reporting (LOR), and will not be discussed further in the report. Two exceedances of the Guidelines were reported in monitoring bore GW-T3E-A on two separate occasions, both for the >C16-C34 total recoverable hydrocarbon fraction. The first exceedance, reported as 1210 µg/L, was noted in November 2017 with the second occurring in June 2018; a duplicate result of 100 µg/L.

This particular bore is located almost directly on a main track frequently used by the general public, local council rangers/officers and by Department of Parks and Wildlife officers.

The many activities which occur on this track, some of which utilize motor vehicles and motorbikes, could be impacting the results of samples from this particular bore. It is also noted that no Project-related construction activities are currently occurring near this site, making it unlikely that the Project has contributed to the trigger exceedances.

Due to the infrequency of these two exceedances and the return to baseline levels at the next monitoring event, they are considered to be an anomaly and unrelated to the assessment of groundwater quality.

3.3.2 Dissolved Metals

Dissolved metals were sampled for on a monthly basis as part of the groundwater sampling program. The majority of these results fell below the DMMP trigger values and a summary of total and dissolved metals results is as follows:

Over the reporting period, 2 July 2017 to 1 July 2018, aluminum was detected at all groundwater locations and was reported in concentrations above the Guidelines at GW-D4 and GW-D5 (Figure 3-4) and then dropped back below baseline at the next sampling event.

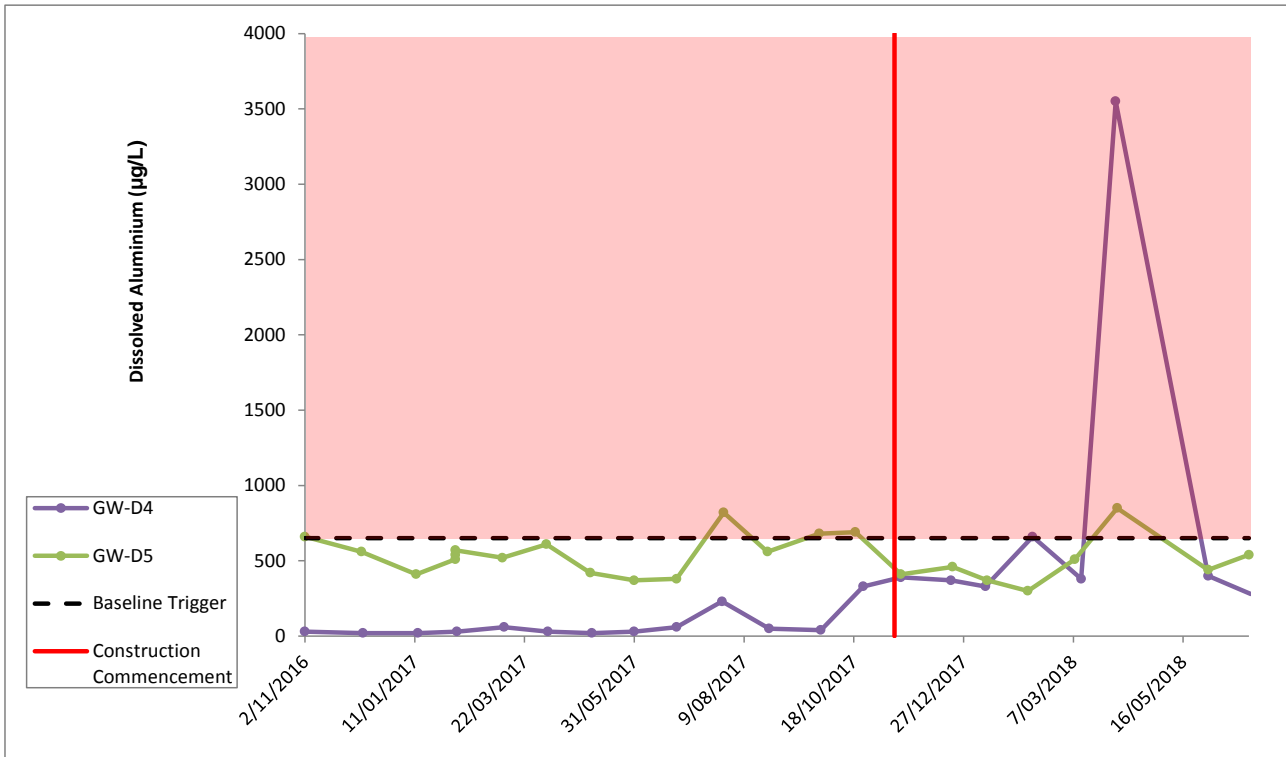


Figure 3-4 - Filtered aluminium concentrations at exceeding bores

Dissolved nickel had a total of two exceedances of the Guidelines; both at GW-D8 in July and August 2017. No exceedances occurred before or after these dates for any bores. The reported concentrations were within the same order of magnitude as the guideline trigger value and returned to levels below the Guidelines immediately after the exceedances occurred. These two exceedances are therefore considered to be within the 'natural variation' of dissolved iron concentrations for this location.

One 'exceedance' of dissolved copper was reported marginally above the trigger value for monitoring bore GW-D4 in September 2017. One minor 'exceedance' of dissolved manganese was also reported at location GW-D7 in July 2017. These results are considered to be within 'natural variation' for these locations, due to the minor nature of the exceedance, sporadic occurrence and the subsequent return of concentrations to below trigger values.

Dissolved iron was detected at all monitoring bores throughout the reporting period, with concentrations reported above the Guideline at locations GW-D5, GW-D7 and GW-D8 (Figure 3-5). All three monitoring bores are located at a distance from current Project activities, with exceedances at GW-D7 and GW-D8 occurring prior to construction commencement. Previously collected data for GW-D5 shows smaller scale exceedances occurring prior to construction commencement, with a larger exceedance occurring over four monitoring events following this date. All monitoring bores reported concentrations below the Guidelines following the exceedances, with the exceedances attributed to 'natural variation'.

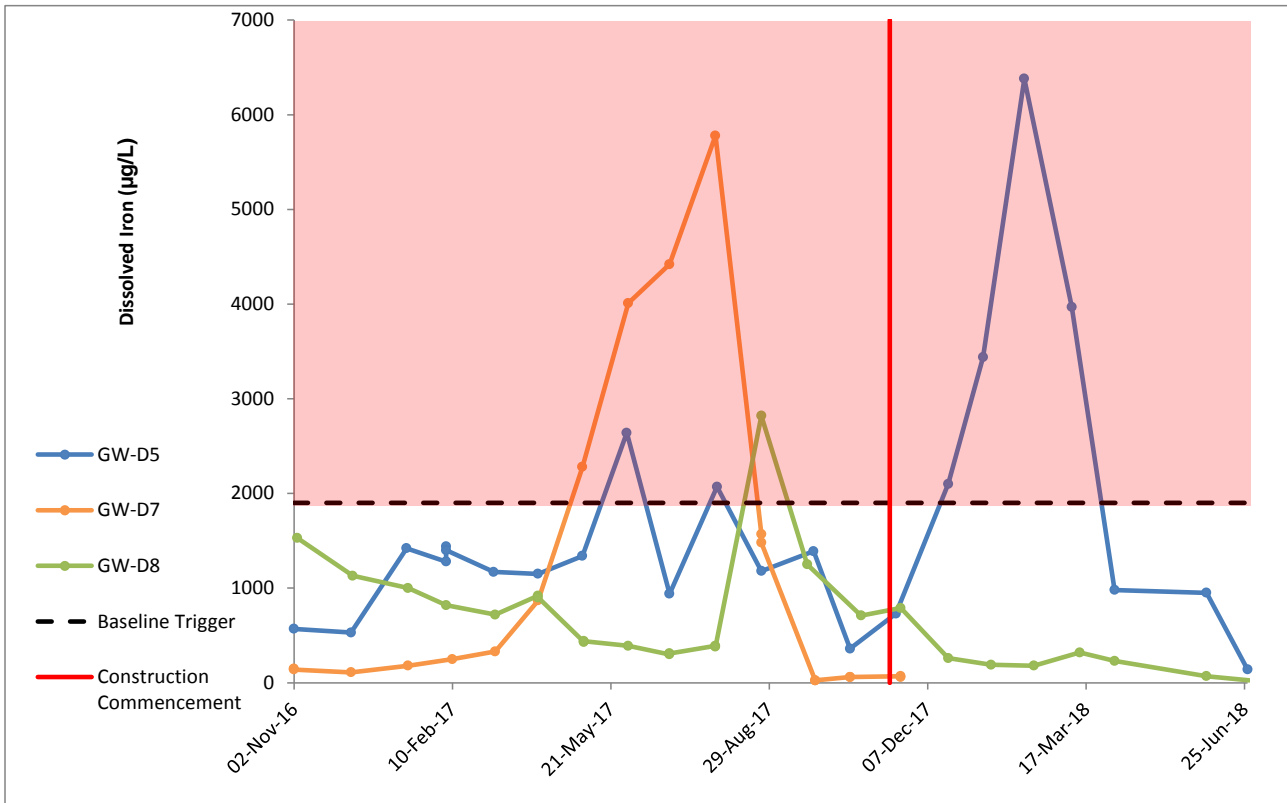
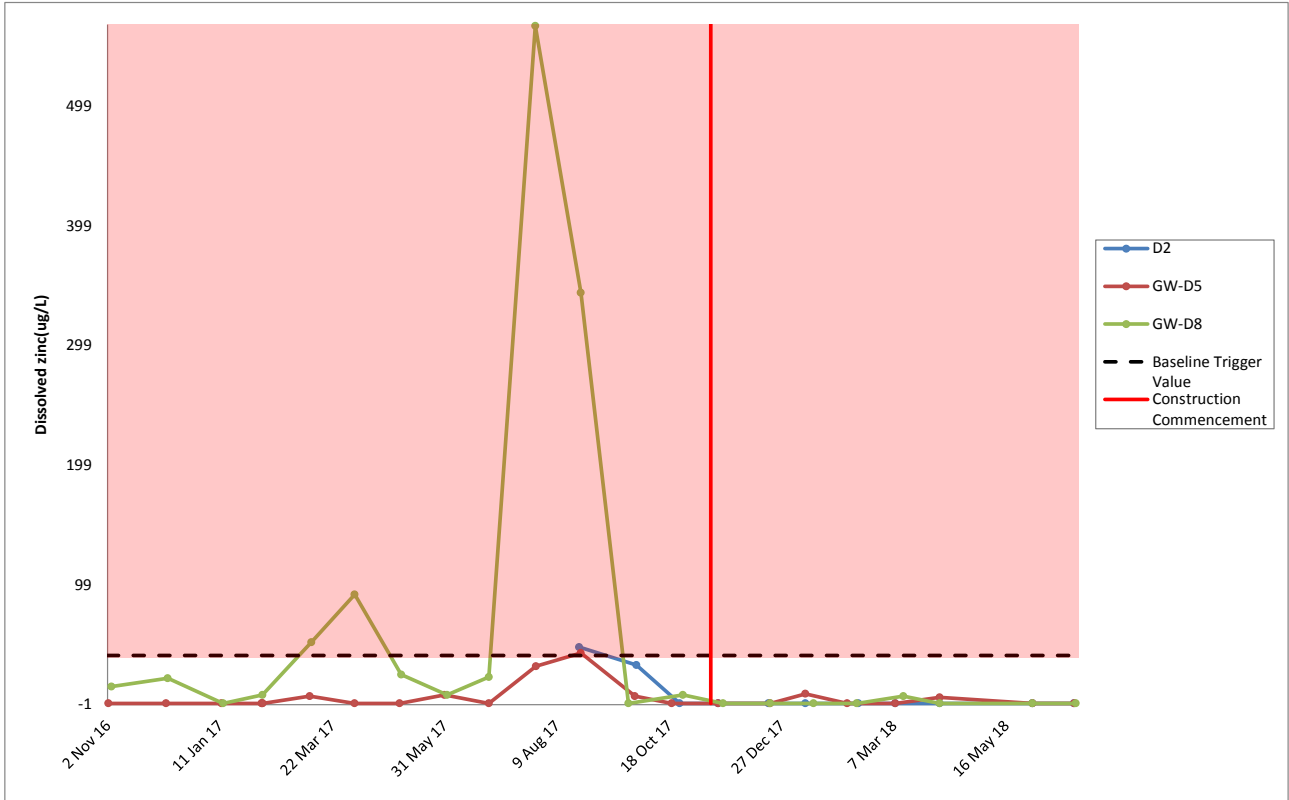


Figure 3-5 - Filtered iron concentrations at exceeding bores

Dissolved zinc exceeded the Guidelines four times at three different locations; D2, GW-D5 and GW-D8. The individual exceedances recorded at D2 and GW-D5 are marginally above the Guidelines before concentrations immediately return to below the trigger level. The two exceedances recorded at GW-D8 in two consecutive months were an order of magnitude higher than the trigger value. Despite the spike in concentration, subsequent monitoring the following month confirmed that concentrations were once again well below the Guidelines. Therefore, due to the return of concentrations to levels below the Guidelines as well as the distance of the location from any Project work, the exceedance is considered to be an anomaly and unrelated to the project activities.



3.3.3 Nutrients

Ammonia as N

All bores that are part of the DMMP, with the exception of GW-D4, showed results of ammonia concentrations consistently above or directly adjacent to the Guideline triggers (Figure 3-6). As these concentrations are recorded on a regular basis, it is considered that they are representative of natural conditions and are unrelated to activities of the Project. A notable spike in concentration recorded for GW-D7 occurred well before the construction commencement date. These high concentrations are therefore not considered to be a contamination event related to the Project and are likely to be merely reflective of natural conditions.

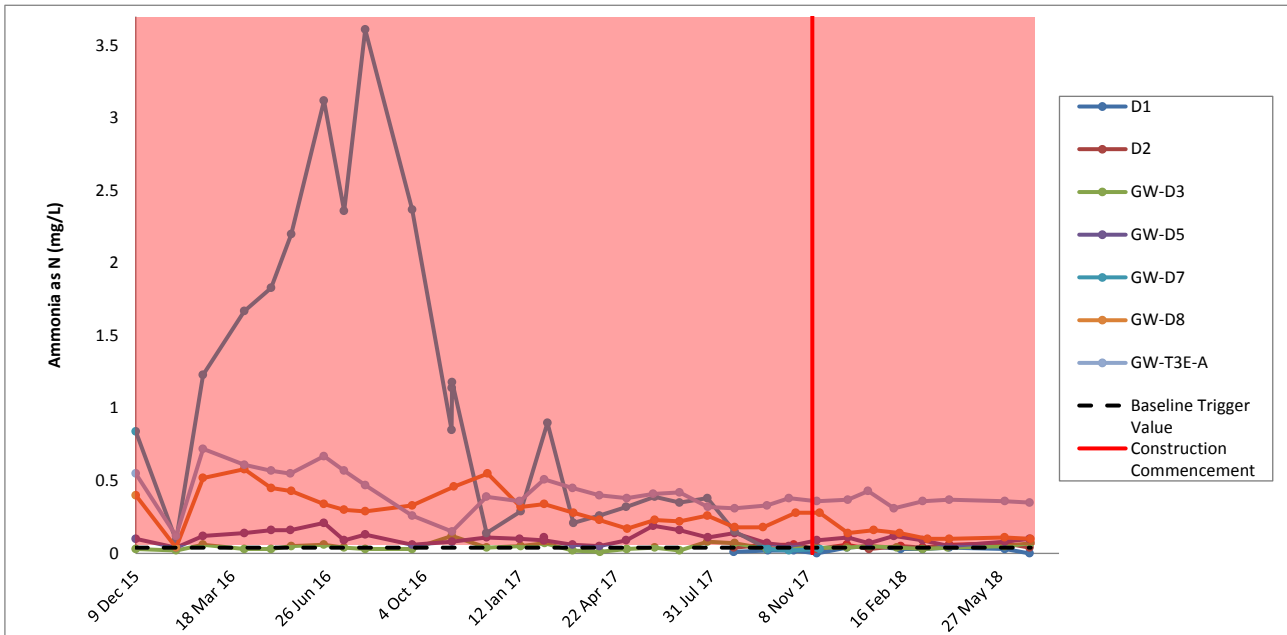


Figure 3-6 - Ammonia (as N) Concentrations

Nitrate as N

All records in bores, with the exception of GW-D5 and GW-T3E-A, showed concentrations of nitrate above the Guidelines. Large increases in concentration are particularly notable in GW-D7, both of which occur in late spring in 2016 and 2017 prior to the construction date. These increases in concentration are considered to represent seasonal influences due to the regularity of the 'spikes'. The concentrations of nitrate in all the bores displayed in Figure 3-7 is considered to represent natural conditions, due to the relatively consistent results presented for each individual bore. There is also no visible impact to nitrate noted after the construction commencement date included on the figure below. Total nitrogen also reflects a similar trend and as such will not be discussed further (Figure 3-8).

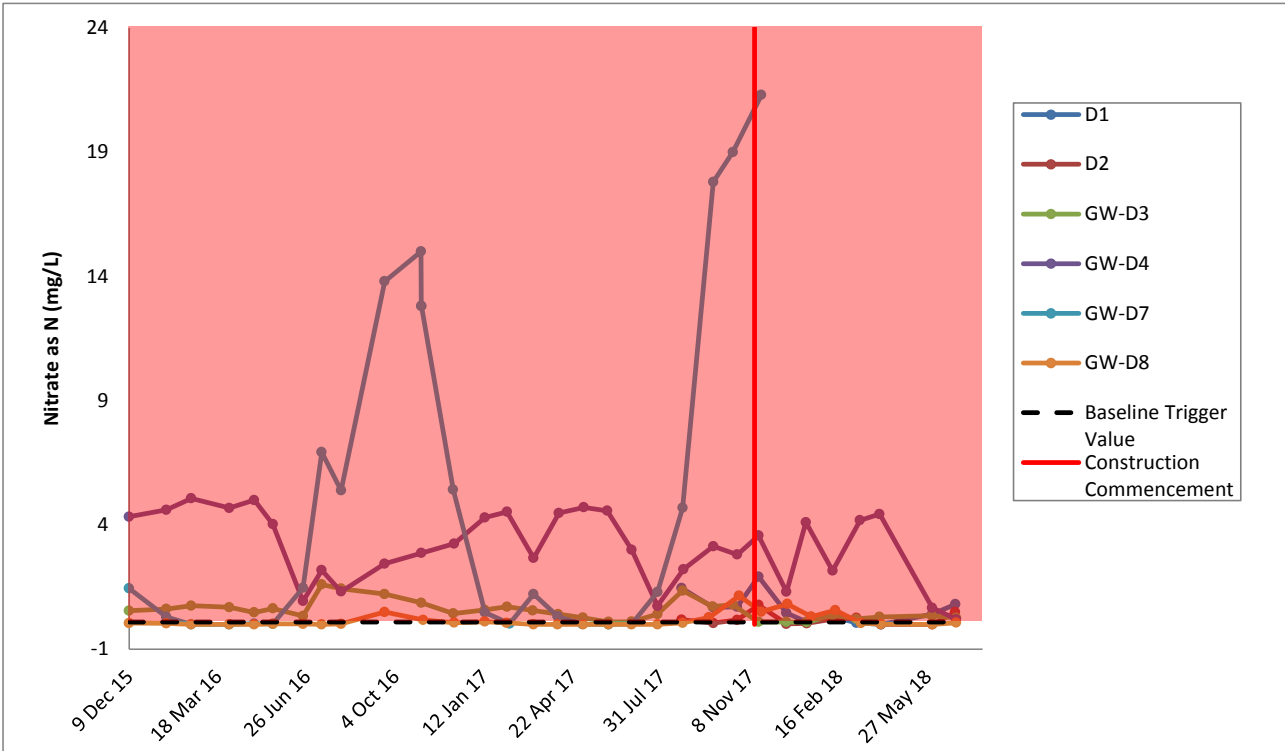


Figure 3-7 - Nitrate (as N) Concentrations

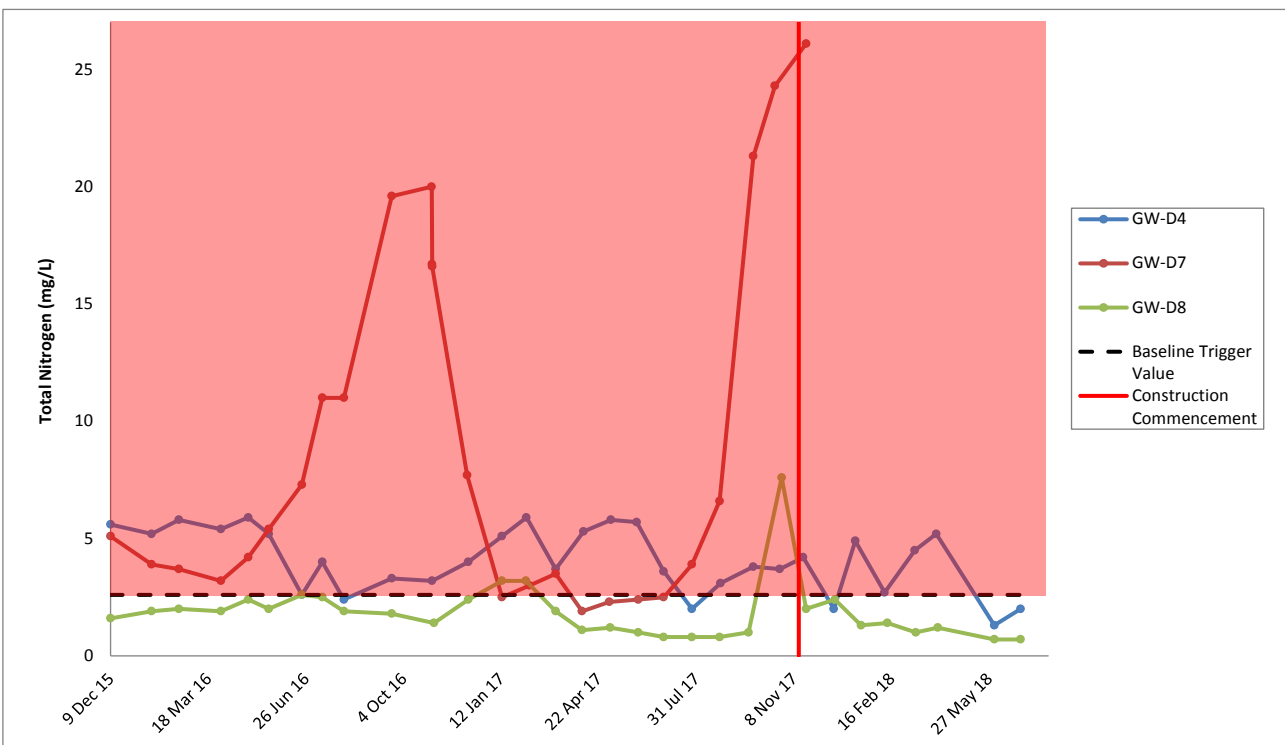


Figure 3-8 - Total Nitrogen Concentrations

Total Kjeldahl Nitrogen

Total Kjeldahl Nitrogen concentrations over the monitoring period show similar patterns in concentrations and seasonal trends as ammonia, total nitrogen and nitrate concentrations discussed above (Figure 3-9).

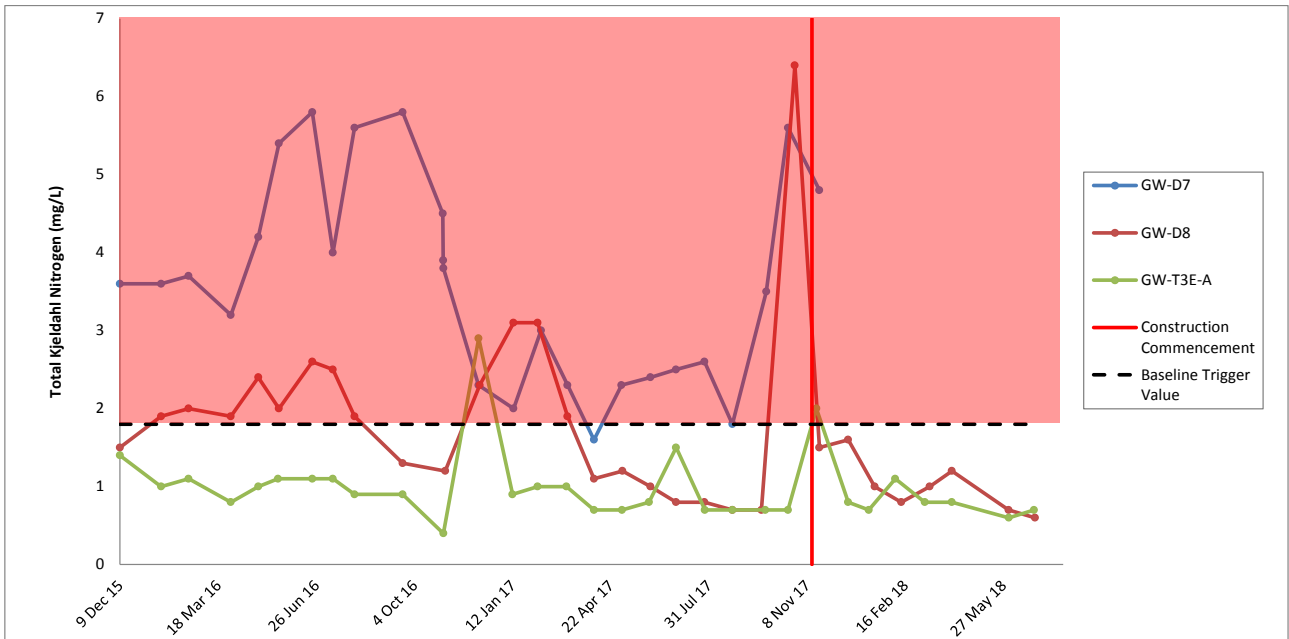


Figure 3-9 - Total Kjeldahl Nitrogen Concentrations

Total Phosphorus

Monitoring bore GW-D7 showed results regularly exceeding the Guideline levels for total phosphorous prior to the construction commencement date. 'Exceedances' recorded for GW-T3E-A are less frequent in occurrence and are minor in nature, with concentrations falling to below the Guidelines immediately following an exceedance. One sample recorded from GW-D5 was reported on the Guideline trigger value, with concentrations in subsequent monitoring events returning to below the Guideline levels. This monitoring bore has previously reported regular, small spikes in concentration below the Guidelines. Due to the factors listed above; total phosphorous exceedances at these three locations are considered to be reflective of natural conditions. D2 and GW-D3 reported spikes above the Guidelines in monitoring events which occurred two and three months after construction commencement, respectively. Both of these bores occur within current construction zones and these exceedances may relate to surrounding clearing activities. As the subsequent monitoring events show that concentrations have returned to below the Guidelines, it is not considered to be a contamination event and no further action was warranted.

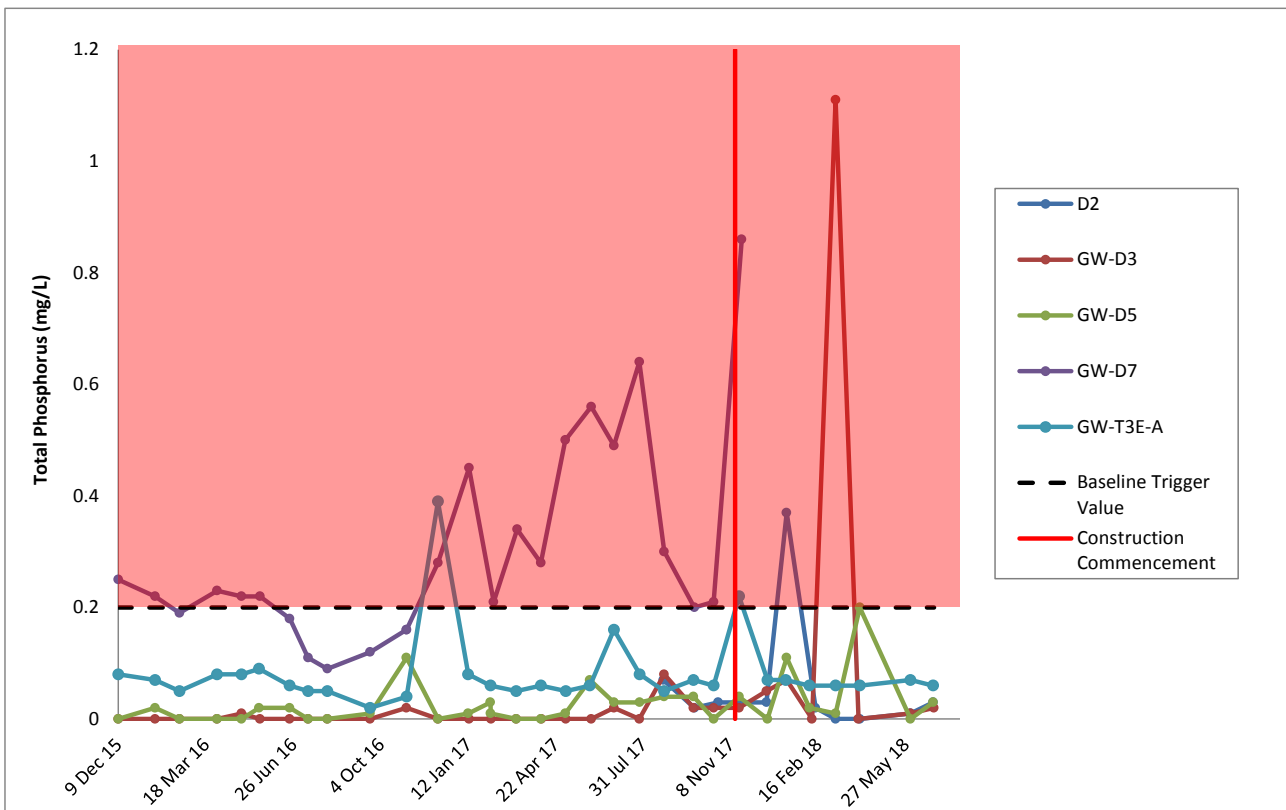


Figure 3-10 - Total Phosphorus Concentrations

4 CONCLUSIONS AND RECOMMENDATIONS

The majority of analytes assessed under the DMMP were reported below the Guidelines over the monitoring period and the Project is overall considered compliant with the DMMP. Analytes which reported minor exceedances of the Guidelines included dissolved metals such as aluminium, zinc, iron, nickel and copper. Nutrients such as ammonia, total nitrogen, nitrate and phosphorus reported larger and more frequent exceedances of the Guidelines, but the reported results have been evaluated against previous monitoring events and baseline data prior to construction and have been evaluated as being representative of natural conditions across the site.

Due to the considerable amount of additional baseline data collected as part of the compliance requirements for the DMMP, it is recommended that baseline values for nutrients are updated. Multiple bores regularly 'exceed' the current guideline values for various nutrients, prior and following construction commencement, indicating that the guideline levels are not representative of natural conditions.

As the drainage basins have not been constructed, the data collected thus far is considered to be additional baseline data. Additionally, due to changes to the original construction footprint, some of the drainage basins will not be constructed. As such, it is recommended that the Guidelines are updated to reflect the changes in project footprint and additional baseline information, as is mentioned above.

5 REFERENCES

Aurecon 2016, *Roe Highway Extension 247607 Baseline Analysis Report – Rev 0*, dated 21 October 2016.

Strategen 2016, *Roe 8 Highway Extension - Drainage Monitoring and Management Plan (DMMP)*, dated August 2016

6 APPENDICIES

Appendix A Field and Analytical Results

Table 1
Field Parameters
Roe 8 Drainage Monitoring and Management Plan
MRIA

Location	Sample Date	Purge Volume L	pH pH Units	Temperature °C	Electrical conductivity µS/cm	Total Dissolved Solids mg/L	Dissolved Oxygen mg/L	Corrected Redox mV	Sample Comments
DMMP Groundwater Baseline Trigger									
D1	10/08/2017	4.5	6.01	19.1	578	375.7	0.86	-55.7	Clear slightly turbid
	23/08/2017	6	5.64	19.7	584	379.6	0.85	384	No odour
	13/09/2017	4	5.63	19.1	490	318.5	0.18	376	Strong sulphur odour, slightly cloudy
	27/09/2017	6	5.62	19	493	320.45	0.22	363.7	-
	5/10/2017	5	5.56	19.4	474.3	308.295	0.13	348.8	-
	24/10/2017	4	5.64	19.7	428.2	278.33	1.26	329.6	Clear, no odour
	6/11/2017	6.7	5.46	19.6	464	301.6	0.18	275.5	Clear, nil odour
	17/11/2017	4.5	5.67	19.6	498.3	323.895	0.25	314.4	Clear, no odour
	1/12/2017	4.5	5.72	20.4	530	344.5	0.24	322.1	-
	19/12/2017	7.5	5.84	19.8	469.2	304.98	0.23	247	Clear, slight sulphur odour
	27/12/2017	6.3	5.61	20.1	462	300.3	0.22	149.4	Clear, very slight sulphur odour
	11/01/2018	5	5.48	20.9	425	276	0.21	310.8	Sulphur odour, clear
	25/01/2018	6	5.52	20.9	496.4	322.66	0.21	261	Mostly clear, sulphur odour
	13/02/2018	8	5.69	21.1	505	328.25	0.93	172.6	Slight sulphur odour, mostly clear
	23/02/2018	3	5.00	21.5	512	332.8	0.3	275	-
	8/03/2018	4.5	5.56	21.9	451.2	293.28	0.24	294.9	-
	22/03/2018	-	5.58	21.9	443.2	288.08	0.23	271.2	-
	4/04/2018	5	5.55	21.7	415.8	270.27	0.29	291.8	-
	18/04/2018	5	5.13	21.8	481.3	312.845	0.27	313.1	No odour, no turbidity, colourless
	17/05/2018	5	5.15	20.8	492.7	320.255	0.49	295.1	Clear, colourless, no turbidity, 5% organic matter
	1/06/2018	3	4.95	20.8	446.5	290.225	0.26	304.6	Clear, no turbidity, no odour, 2% organic matter
	14/06/2018	-	5.01	20.8	465.6	302.64	0.34	322.4	Colourless, slightly turbid, no odour
27/06/2018	2.5	5.04	20.2	536	348.4	0.33	351.4	Clear, colourless, no odour	
12/07/2018	4	4.91	19.4	490	318.5	0.38	333.6	Medium turbidity, colourless, no odour	
27/07/2018	-	4.85	19.5	528	343.2	0.46	303.9	Clear, colourless, no turbidity, sulphur odour	
10/08/2018	-	4.63	18.5	651	423.15	0.64	377.1	Clear, colourless, no odour, no turbidity	
22/08/2018	-	4.91	18.8	462	300.3	0.36	359.6	Clear, colourless, odourless	
D2	10/08/2017	7	6.61	17.7	658	427.7	5.11	50.5	Nil odour, cloudy, brown
	23/08/2017	7	6.11	18.2	649	421.85	1.73	331.6	Slightly turbid, no odour
	13/09/2017	3	6.08	18.4	691	449.15	0.27	352	-
	27/09/2017	5	6.10	18.4	647	420.55	0.61	331.8	-
	5/10/2017	-	6.12	18.4	657	427.05	1.17	312.1	-
	24/10/2017	1.8	6.16	18.8	530	344.5	0.25	308.2	Turbid
	6/11/2017	4.9	5.95	19.1	592	384.8	0.18	258.6	Clear
	17/11/2017	5.3	6.28	19.3	553	359.45	1.37	319.1	No odour, slightly turbid
	1/12/2017	6.5	6.06	19.5	691	449.15	0.52	289.9	Turbid
	19/12/2017	5.8	6.26	19.8	633	411.45	0.49	250.8	Slightly turbid, nil odour
	11/01/2018	5.5	6.00	20.6	741	481.65	0.85	332.4	Murky water
	25/01/2018	6	6.08	20.6	765	497.25	0.83	318.6	Slightly turbid
	13/02/2018	4	6.07	21.6	613	398.45	0.23	272.4	Slight sulphur odour, slightly turbid
	23/02/2018	3	6.06	21	508	330.2	0.33	280	-
	8/03/2018	9.5	6.08	21.7	557	362.05	0.37	242.5	-
	22/03/2018	-	6.12	21.4	582	378.3	0.25	272.8	-
	4/04/2018	4	6.17	21.5	492.2	319.93	0.31	290.3	-
	18/04/2018	7	5.84	21.5	458.9	298.285	0.24	218.5	Clear, no turbidity
	17/05/2018	5	5.95	20.9	415.7	270.205	0.36	172.8	Clear, no turbidity, no odour
	1/06/2018	4	5.74	21.1	419.6	272.74	0.29	204.1	Initially cloudy, no turbidity, then clear, no odour
	14/06/2018	-	5.79	20.7	452.3	293.995	0.34	289.6	Turbid, light brown, no odour
	27/06/2018	4.5	5.55	19.8	380.5	247.325	0.3	330.7	Clear, slight sulphur odour, no turbidity
GW-D3	12/07/2017	1.8	5.54	20.8	314.1	204.165	1.98	-25.3	Clear, nil odour
	27/07/2017	3.6	5.46	20.3	336.9	218.985	1.6	-36.9	No odour, clear.
	10/08/2017	3	5.74	19.4	333	216.45	1.96	-17	Clear
	24/08/2017	3.6	5.75	18.6	321.4	208.91	3.81	364.8	Clear, nil odour
	7/09/2017	4	5.80	19.4	311.9	202.735	3.33	344.5	Mostly clear, no odour
	26/09/2017	5	5.70	19.1	332.7	216.255	2.52	331.9	Slightly turbid
	5/10/2017	4	5.66	19.7	330.2	214.63	2.61	307.2	Clear, odourless
	19/10/2017	6	5.70	19.9	317.4	206.31	1.34	302.9	Mostly clear, slight sulphur odour
	3/11/2017	4.5	5.61	19.9	329.2	213.98	0.56	293.2	Clear
	17/11/2017	3.6	5.50	19.9	350.3	227.695	0.23	286	Clear, no odour
	1/12/2017	9	5.65	21.2	355.3	230.945	1.35	284	Clear, no odour
	19/12/2017	3	5.53	20.8	374.2	243.23	0.36	305.9	Clear, nil odour
	27/12/2017	3	5.30	20.6	386	250.9	0.23	257	Slightly milky, odourless
	11/01/2018	3	5.25	21.5	382.7	248.755	0.27	338.1	Clear, some odour, NTU jumping a lot
	25/01/2018	9	5.56	22.1	351.8	228.67	0.29	315.8	Mostly clear, no odour
	9/02/2018	6	5.46	22.2	363.5	236.275	0.33	309.4	Mostly clear, nil odour
	22/02/2018	3	5.38	22.4	378.1	245.765	0.29	303.6	-
	8/03/2018	3.25	5.49	21.9	376.4	244.66	0.27	284.6	Nil odour, clear
	22/03/2018	-	5.49	22.2	374.8	243.62	0.3	279.9	-
	3/04/2018	-	5.61	22.8	344.7	224.055	0.35	272.6	-
	18/04/2018	3.5	5.32	21.9	379.2	246.48	0.3	292.6	No turbidity, mild sulphur smell, clear
	16/05/2018	5	5.18	22.3	374.4	243.36	0.3	263.2	Clear, colourless, no turbidity, no odour
1/06/2018	6	5.11	21.5	364.2	236.73	0.36	257.8	Clear, colourless, no turbidity, no odour	
15/06/2018	-	5.12	20.7	373.1	242.515	0.35	220.7	Clear, colourless, no odour	
28/06/2018	-	5.11	20.9	364.7	237.055	0.43	278.6	Clear, colourless, no turbidity, no odour	
GW-D4	12/07/2017	4	6.22	17.9	245.5	159.575	4.42	27.6	-
	26/07/2017	4.9	6.19	18.4	202.5	131.625	3.86	34.9	Slightly cloudy, no odour
	10/08/2017	6.3	6.81	17.2	169	109.85	4.63	369	Clear, light sheen on top
	25/08/2017	4.5	6.04	17.6	216	140.4	6.04	372	Clear, no odour
	7/09/2017	4	6.11	18.4	216	140.4	2.02	351.3	Turbid, no odour
	27/09/2017	-	6.17	18.3	258.7	168.155	2.64	343.6	-
	5/10/2017	6	6.04	18.4	262.8	170.82	3.06	335.4	-
	24/10/2017	1.2	6.00	19	221.7	144.105	1.81	342.1	-
	3/11/2017	5	5.92	19.3	258.7	168.155	2.04	327.5	Slightly turbid
	17/11/2017	9.1	5.99	19.6	256.2	166.53	2.45	334.5	-
	1/12/2017	8	5.99	20	249.7	162.305	3.11	306.7	Nil odour, slightly turbid
	19/12/2017	4.5	6.02	21.1	188.3	122.395	0.82	332.4	Clear to slightly turbid
	27/12/2017	1.3	5.68	20.6	252.4	164.06	2.75	307	Odourless
	10/01/2018	6	5.68	21.2	259.1	168.415	2.96	337	Clear, odourless
	25/01/2018	5	5.84	22.3	255.8	166.27	2.8	345.6	-
	9/02/2018	6.5	5.83	21.8	219.5	142.675	2.91	349.3	Mostly clear, nil odour
	23/02/2018	4.2	5.89	22	254.5	165.425	4.07	363.7	-
	9/03/2018	5	5.96	22.8	251.5	163.475	4.06	318	-
	22/03/2018	-	5.96	22.5	253.9	165.035	3.5	310.7	-
	3/04/2018	3	5.92	22.8	238.5	155.025	3.31	301	-
	18/04/2018	5	5.65	22.3	250.2	162.63	2.96	324.7	No odour, clear/no turbidity
	16/05/2018	6	5.61	21.7	233.6	151.84	5.78	304.5	Slightly cloudy, low turbidity
1/06/2018	7	5.76	19.8	177.6	115.44	2.49	299.7	Initially turbid, clear, colourless, no odour	
14/06/2018	-	5.69	19.7	267	173.55	2.28	276.9	Clear, colourless, odourless	
28/06/2018	-	5.83	17.5	274.4	178.36	4.59	262.1	Initial turbidity, then light brown, clear, no odour	

Table 1
Field Parameters
Roe 8 Drainage Monitoring and Management Plan
MRIA

Location	Sample Date	Purge Volume	pH	Temperature	Electrical conductivity	Total Dissolved Solids	Dissolved Oxygen	Corrected Redox	Sample Comments	
		L	pH Units	°C	µS/cm	mg/L	mg/L	mV		
DMMP Groundwater Baseline Trigger										
GW-D5	12/07/2017	3	5.28	18.3	970	630.5	0.57	-99	Turbid, sulphur odour.	
	27/07/2017	3	5.26	18.5	1,015	659.75	0.47	-99.1	Slightly turbid	
	10/08/2017	3.8	5.13	17.5	634	412.1	1.04	-39.7	Tea-stained, slight sulphur odour	
	24/08/2017	4.8	5.37	18.6	778	505.7	1.56	300.3	Slightly turbid, no odour	
	6/09/2017	5.8	5.43	18.7	971	631.15	0.11	211.8	Weak tea colour, slight sulphur odour	
	26/09/2017	6.4	5.24	17.7	734	477.1	1.03	313.2	Tea colour	
	5/10/2017	4.5	5.47	17.6	898	583.7	0.13	227.8	Sulphur odour, weak tea colour	
	19/10/2017	4	5.49	18	957	622.05	0.21	248.9	Slightly turbid	
	3/11/2017	4	5.32	18.3	1,144	743.6	0.16	230.4	Slightly turbid, sulphur smell.	
	17/11/2017	4.5	5.44	19.4	1,206	783.9	0.18	243.7	-	
	4/12/2017	5	5.45	19	1,063	690.95	0.21	184.3	Slight sulphur odour, mostly clear	
	20/12/2017	8	5.43	19.3	1,165	757.25	0.17	186.9	-	
	27/12/2017	3	5.09	19.2	1,206	783.9	0.23	190.4	Slight, sulphur odour, clear	
	11/01/2018	3.5	5.25	20.2	1,163	755.95	0.19	226.8	Sulphur smell, yellow	
	24/01/2018	4	5.41	20.7	1,066	692.9	0.22	218	Mostly clear, sulphur odour	
	6/02/2018	3	5.45	21.3	1,090	708.5	0.22	178.7	-	
	22/02/2018	5	5.30	21	1,291	839.15	0.2	196.1	-	
	8/03/2018	3.5	5.44	20.3	1,273	827.45	0.23	170.4	-	
	23/03/2018	-	5.49	19.9	1,129	733.85	0.27	174	-	
	4/04/2018	-	5.30	21.4	1,406	913.9	0.27	166.4	-	
	18/04/2018	4.25	5.25	20.9	1,447	940.55	0.23	146.5	Low turbidity for initial squirt, sulphur odour, small amount of organic matter	
	17/05/2018	6	5.16	19.5	1,018	661.7	0.33	151.8	Mild sulphur odour, no turbidity, clear/colourless	
	1/06/2018	5.5	4.92	19.5	998	648.7	0.42	178.5	Clear, no turbidity, slight sulphur odour, yellow colour	
	14/06/2018	-	4.76	19.2	972	631.8	0.33	208.6	Initially brown, slightly turbid, odourless; then light brown, clear, odourless.	
	27/06/2018	5	4.83	18.8	846	549.9	0.4	201.5	Initially brown with some turbidity, then clear colourless, no turbidity, sulphur odour	
	GW-D7	12/07/2017	4.5	6.92	19.8	2,132	1,386	0.78	-74	Milky, metallic smell
		26/07/2017	2.8	6.83	19.4	1,944	1,264	0.55	-144.7	Very cloudy, milky
		10/08/2017	6.4	7.44	17.8	798	518.7	4.99	32	Very cloudy, yellow to brown, nil odour
		24/08/2017	6	7.22	17.3	1,197	778.05	3.71	172.5	Slightly turbid, no odour
		7/09/2017	5	7.13	18.7	1,381	897.65	4.33	275.7	-
		27/09/2017	8	7.28	18.2	1,456	946.4	6.23	290.5	-
		19/10/2017	5	7.09	18.9	1,601	1,041	6.2	284.6	Cloudy yellow, mostly clear, cover partially buried in limestone, appears that some may have fallen in the well
		6/11/2017	4	7.06	19.3	1,240	806	5.38	301	-
20/11/2017		8	7.04	20.1	1,312	852.8	4.7	267.3	Turbid, cloudy, YSI fell over at 2:20, sampled.	
12/07/2017		4.7	5.18	19.6	402.6	261.69	0.59	-89.1	Slightly turbid, sulphur odour, milky.	
GW-D8	26/07/2017	1.9	5.12	19.2	395	256.75	0.75	-64	Cloudy, sulphur odour	
	9/08/2017	6.2	5.68	19.9	412	267.8	0.67	-128	Cloudy, sulphur odour	
	24/08/2017	4.2	5.29	19.7	577	375.05	1.81	235.5	Milky, sulphur smell	
	22/09/2017	4.5	6.23	19.9	732	475.8	0.38	100.8	Clear, slight sulphur smell	
	4/10/2017	4.1	6.16	20	850	552.5	0.37	132.3	Sulphur odour, slightly turbid	
	5/10/2017	7	7.29	18.1	939	610.35	6.02	286	Turbid, nil odour	
	26/10/2017	4	6.09	19.9	1,083	703.95	0.61	142.2	Heavy rain inbetween parameter readings at 15:43pm and 15:55pm	
	6/11/2017	5.6	6.02	21.3	1,204	782.6	0.48	121.8	Strong sulphur odour, slightly turbid, mostly clear.	
	20/11/2017	4.5	6.28	21.1	1,055	685.75	0.38	120.9	-	
	5/12/2017	3	6.31	22.6	877	570.05	0.39	90.9	Clear	
	19/12/2017	6	6.38	20.3	669	434.85	1.82	84	Slightly turbid, sulphur smell	
	27/12/2017	2.2	6.29	22	576	374.4	2.17	86.1	Strong sulphur odour, brown, clear	
	16/01/2018	6.3	6.78	20.8	434.2	282.23	3.14	91.4	Slightly turbid	
	29/01/2018	4.5	7.34	21.6	472.6	307.19	8.82	122.1	Strong sulphur odour	
	12/02/2018	6	6.38	21.1	533	346.45	0.42	104.4	Strong sulphur odour, slightly milky	
	23/02/2018	5	6.32	21.2	475	308.75	0.49	102.5	-	
	12/03/2018	9	6.44	21.9	385.6	250.64	0.41	81.2	-	
	23/03/2018	-	6.55	21.3	342.3	222.495	0.4	71.6	Pump stopped working at 7:29, started again at 11:44	
	4/04/2018	2	6.27	23.6	320.7	208.455	0.62	92.3	-	
	19/04/2018	1.5	6.23	20.7	325.5	211.575	1.91	100	Replaced tubing. Turbid/cloudy, sulphur odour, grey/brown colour, no particulates.	
16/05/2018	3	5.95	20.6	334.1	217.165	0.57	91.5	Strong sulphur smell, slight turbidity		
1/06/2018	-	6.05	20.5	320.4	208.26	1.39	88.7	Initial strong sulphur odour, slightly cloudy, then clear, yellow, no turbidity, no odour		
15/06/2018	-	6.12	18.5	322.7	209.755	2.55	106.5	Clear, colourless, no odour		
28/06/2018	3	6.23	19.8	289.4	188.11	2.45	126.4	Clear, colourless, no turbidity, no odour		
GW-T3E-A	12/07/2017	2.8	5.29	19.4	886	575.9	0.76	-91	Slight sulphur odour, clear.	
	27/07/2017	3.5	5.23	19.4	731	475.15	0.56	-105.2	Clear, strong sulphur odour	
	10/08/2017	5	5.28	19	737	479.05	0.5	-95	Clear	
	24/08/2017	4.8	5.08	19.1	820	533	0.51	247	-	
	6/09/2017	7	4.73	19.4	1,093	710.45	0.1	178.8	Slightly turbid, slight sulphur odour	
	26/09/2017	6	5.25	18.7	830	539.5	0.18	273.4	Sulphur smell, organics visible	
	5/10/2017	6	4.96	18.7	1,029	668.85	0.12	230.1	Clear, slight sulphur odour	
	19/10/2017	6	5.21	18.9	839	545.35	0.29	202.8	Slight sulphur odour, slightly cloudy	
	3/11/2017	4	5.11	19.1	811	527.15	0.18	211.6	Clear, sulphur smell	
	17/11/2017	3.6	5.26	19.5	856	556.4	0.19	195.9	Slightly turbid, sulphur odour	
	1/12/2017	5	5.26	19.5	875	568.75	0.23	171.8	Clear, sulphur odour	
	20/12/2017	3	5.37	19.9	790	513.5	0.26	136.1	-	
	27/12/2017	-	5.13	19.8	761	494.65	0.24	150.6	Clear, slight sulphur odour	
	10/01/2018	-	4.94	20.4	1,026	666.9	0.22	-95	Sulphur smell, turbid, NTU jumping	
	24/01/2018	4.3	5.04	20.4	846	549.9	0.25	193.4	Mostly clear, slight sulphur odour	
	6/02/2018	5	4.85	20.7	950	617.5	0.24	166.7	-	
	22/02/2018	4	5.16	20.6	827	537.55	0.28	171.2	-	
	8/03/2018	7	5.14	20.2	855	555.75	0.22	160.9	-	
	23/03/2018	-	5.22	20.3	804	522.6	0.31	153.4	-	
	4/04/2018	6	5.26	20.2	726	471.9	0.32	143.8	-	
	18/04/2018	5	5.06	20.8	786	510.9	0.27	152.4	Rain intermittent, sunny patches, turbid, strong sulphur odour, colourless	
	16/05/2018	4	4.93	20.6	728	473.2	0.58	158.4	Strong sulphur odour, initial purge of brown water, 10% organic matter, eventually colourless	
	1/06/2018	2	4.65	20.1	743	482.95	0.25	141.3	Clear, no turbidity, no odour, colourless	
	14/06/2018	-	4.80	20.1	735	477.75	0.7	143	Clear, colourless, slight decaying leaves odour	
	27/06/2018	2	4.79	19.7	694	451.1	0.3	145.5	Sulphur odour, colourless, clear	

Legend
L = litres
°C = Degrees Celcius
µS/cm = microseimens per centimetre
mg/L = miligrams per litre
mV = millivolts
*- = not reported

Table 2
Analytical Results
Roe 8 Drainage Management Monitoring Plan
MRIA

COPC Group	Units	LOR	Location BR8 Groundwater Baseline Trigger	D1												D2											
				Sample Date	23-Aug-17	27-Sep-17	24-Oct-17	17-Nov-17	19-Dec-17	11-Jan-18	13-Feb-18	08-Mar-18	04-Apr-18	01-Jun-18	27-Jun-18	23-Aug-17	27-Sep-17	24-Oct-17	17-Nov-17	19-Dec-17	11-Jan-18	13-Feb-18	08-Mar-18	04-Apr-18	01-Jun-18	27-Jun-18	
				Field ID	D1_230817	D1_270917	D1_241017	D1	D1	D1	D1	D1	D1	D1_01_06_18	D1_27_06_18	D2_230817	D2_270917	D2_241017	D2	D2	D2	D2	D2	D2	D2_01_06_18	D2_27_06_18	
				Lab Report No.	EP1709130	EP1710701	EP1711878	EP1712990	EP1714429	EM1801446	EP1802359	EP1803299	EP1804348	EP1806776	EP1807736	EP1709130	EP1710701	EP1711878	EP1712990	EP1714429	EM1801446	EP1802359	EP1803299	EP1804348	EP1806776	EP1807736	
Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary				
Total Petroleum Hydrocarbons				<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20			
C6-C9 fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20			
C10-C14 fraction	µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
C15-C28 fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
C29-C36 fraction	µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
C10-C36 fraction (sum)	µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50			
Total Recoverable Hydrocarbons				<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20			
C6-C10 fraction (minus BTEX)(F1)	µg/L	20	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20			
>C10-C16 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
>C10-C16 (minus Naphthalene)(F2)	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
>C16-C34 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
>C34-C40 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
>C10-C40 fraction (sum)	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100			
BTEX				<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Benzene	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Toluene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2			
Ethylbenzene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2			
m&p-Xylene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2			
o-Xylene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2			
Total Xylenes	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2			
Total BTEX	µg/L	2	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Naphthalene (VOC)	µg/L	5	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5			
Metals				-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Aluminium	µg/L	10	650	260	90	110	100	100	80	110	70	80	60	20	270	290	360	520	410	420	350	300	230	260	190		
Aluminium (Filtered)	µg/L	10	8.4	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Arsenic (Filtered)	µg/L	1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Cadmium	µg/L	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Cadmium (Filtered)	µg/L	0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1			
Chromium	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Chromium (Filtered)	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1			
Copper (Filtered)	µg/L	1	26	4	4	<1	<1	<1	<1	<1	<1	<1	<1	<1	1	5	<1	3	1	4	<1	<1	<1	<1			
Iron	µg/L	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Iron (Filtered)	µg/L	50	1900	50	280	330	290	360	420	470	580	670	510	<50	90	60	60	<50	60	<50	60	60	60	<50			
Lead (Filtered)	µg/L	1	10	1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	3	4	2	2	3	2	5	4	2	5	3		
Manganese	µg/L	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Manganese (Filtered)	µg/L	1	50	3	3	2	2	1	2	1	2	2	3	<1	3	2	1	<1	<1	<1	<1	<1	<1	1			
Nickel	µg/L	1	11	1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	2	2	<1	<1	<1	1	<1	<1	<1	<1			
Nickel (Filtered)	µg/L	1	11	1	1	<1	<1	1	<1	<1	<1	<1	<1	<1	2	2	<1	<1	<1	1	<1	<1	<1	<1			
Selenium	µg/L	2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Selenium (Filtered)	µg/L	0.2	5	<0.2	0.3	0.7	<2	<0.2	<2	<2	<2	<2	<10	<2	<10	<0.2	0.4	0.5	<2	0.3	<2	<2	<10	<2			
Zinc	µg/L	5	40	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-			
Zinc (Filtered)	µg/L	5	40	29	25	<5	<5	<5	<5	<5	<5	<5	<5	<5	47	32	<5	<5	<5	<5	<5	<5	<5	<5			
Nutrients				0.04	0.01	0.02	0.02	<0.01	0.04	0.05	0.03	0.03	0.04	0.03	<0.01	0.04	0.06	0.06	0.03	0.06	0.03	0.05	0.04	0.06	0.07	0.04	
Ammonia (as N)	mg/L	0.01	0.04	0.01	0.02	0.02	<0.01	0.04	0.05	0.03	0.03	0.04	0.03	<0.01	0.04	0.06	0.06	0.03	0.06	0.03	0.05	0.04	0.06	0.07	0.04		
Nitrate (as N)	mg/L	0.01	0.1	1.46	0.68	0.71	1.92	0.46	0.1	0.27	0.06	<0.01	0.42	0.81	0.19	0.05	0.18	0.78	0.02	0.04	0.23	<0.01	<0.01	<0.01	0.49		
Nitrite (as N)	mg/L	0.01	0.1	0.02	0.03	0.02	0.06	0.01	0.01	0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01		
Total Kjeldahl Nitrogen	mg/L	0.1	1.8	0.3	0.2	0.2	0.4	0.2	1	0.2	<0.1	<0.1	<0.1	0.2	0.9	0.9	0.9	1.2	1.1	1.7	1	0.6	0.5	0.7	0.5		
Nitrate & Nitrite (as N)	mg/L	0.01	0.1	1.48	0.71	0.73	1.98	0.47	0.11	0.28	0.06	<0.01	0.42	0.83	0.19	0.05	0.18	0.78	0.02	0.04	0.23	<0.01	<0.01	<0.01	0.49		
Total Nitrogen (as N)	mg/L	0.1	2.6	1.8	0.9	0.9	2.4	0.7	1.1	0.5	<0.1	<0.1	0.4	1	1.1	1	1.1	2	1.1	1.7	1.2	0.9	0.5	0.7	1		
Reactive Phosphorus (as P)	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.04	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01		
Total Phosphorus	mg/L	0.01	0.2	0.02	0.01	0.01	<0.01	0.03	0.07	0.02	<0.01	<0.01	0.01	<0.01	0.02	0.07	0.02	0.03	0.03	0.03	0.37	0.02	<0.01	<0.01	0.01	0.03	

Legend
 µg/L = micrograms per litre
 mg/L = milligrams per litre
 "-" = not reported
 LOR = Laboratory Limit of Reporting
 COPC = Chemicals of Potential Concern

Table 2
Analytical Results
Roe 8 Drainage Management Monitoring Plan
MRIA

COPC Group	Units	LOR	Location BR8 Groundwater Baseline Trigger	GW-D5													GW-D7								
				Sample Date	27-Jul-17	24-Aug-17	26-Sep-17	19-Oct-17	17-Nov-17	20-Dec-17	11-Jan-18	06-Feb-18	08-Mar-18	04-Apr-18	01-Jun-18	27-Jun-18	26-Jul-17	24-Aug-17	24-Aug-17	27-Sep-17	19-Oct-17	19-Oct-17	20-Nov-17	20-Nov-17	
				Field ID	GW-D5_270717	GW-D5_240817	GW-D5_260917	GW-D5_191017	GW-D5_171117	GW-D5_201217	EM1801446	GW-D5_0618	GW-D5_0818	GW-D5_0418	GW-D5_0118	GW-D5_270618	GW-D7_260717	GW-D7_240817	WQA01_240817	GW-D7_270917	WQA01_260917	GW-D7_191017	WQA01_191017	GW-D7_201117	WQA01_201117
				Lab Report No.	EP1708050	EP1709182	EP1710595	EP1711669	EP1712990	EP1714429	EM1801446	EP1802093	EP1803299	EP1804348	EP1806776	EP1807736	EP1707992	EP1709182	EP1709182	EP1710701	EP1710701	EP1711669	EP1711669	EP1713111	EP1713111
Sample Type	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Primary	Duplicate	Primary	Duplicate	Primary	Duplicate	Primary	Duplicate			
Total Petroleum Hydrocarbons																									
C6-C9 fraction	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		
C10-C14 fraction	µg/L	50		<50	<50	<50	<50	70	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50		
C15-C28 fraction	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
C29-C36 fraction	µg/L	50		<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50		
C10-C36 fraction (sum)	µg/L	50		<50	<50	<50	<50	70	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50		
Total Recoverable Hydrocarbons																									
C6-C10 fraction	µg/L	20	20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		
C6-C10 fraction (minus BTEX)(F1)	µg/L	20		<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20	<20		
>C10-C16 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
>C10-C16 (minus Naphthalene)(F2)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
>C16-C34 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
>C34-C40 fraction	µg/L	100	100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
>C10-C40 fraction (sum)	µg/L	100		<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100	<100		
BTEXN																									
Benzene	µg/L	1	1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Toluene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
Ethylbenzene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
m,p-Xylene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
o-Xylene	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
Total Xylenes	µg/L	2	2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2	<2		
Total BTEX	µg/L	1	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1	<1		
Naphthalene (VOC)	µg/L	5	5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5	<5		
Metals																									
Aluminium	µg/L	10		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Aluminium (Filtered)	µg/L	10	650	820	560	680	690	410	460	370	300	510	850	440	540	10	10	<10	10	10	30	20	40	40	
Arsenic (Filtered)	µg/L	1	8.4	2	1	1	1	<1	1	1	<1	2	1	<1	7	5	5	1	1	2	2	2	2	2	
Cadmium	µg/L	0.1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium (Filtered)	µg/L	0.1	0.2	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1	
Chromium	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium (Filtered)	µg/L	1	1	3	2	2	3	1	1	2	1	2	3	2	<1	2	<1	1	1	<1	1	1	1	1	
Copper (Filtered)	µg/L	1	26	3	8	<1	<1	<1	<1	2	<1	<1	<1	<1	8	4	2	9	3	3	3	2	2	2	
Iron	µg/L	50		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron (Filtered)	µg/L	50	1900	2070	1180	1390	360	730	2100	3440	6380	3970	980	950	140	5780	1570	1480	<50	<50	60	60	70	60	
Lead (Filtered)	µg/L	1	10	2	2	<1	<1	<1	<1	<1	<1	<1	<1	<1	2	<1	<1	2	<1	<1	<1	<1	<1	<1	
Manganese	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese (Filtered)	µg/L	1	50	3	3	3	<1	<1	2	5	7	3	<1	1	<1	98	34	33	4	2	2	6	6		
Nickel	µg/L	1		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel (Filtered)	µg/L	1	11	2	2	2	<1	<1	<1	<1	<1	<1	<1	<1	4	2	1	2	<1	1	1	1	1		
Selenium	µg/L	2		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium (Filtered)	µg/L	0.2	5	<10	<10	<0.2	0.3	<0.2	<2	0.2	<2	<2	<2	<10	<2	<10	<10	<10	<0.2	<0.2	0.5	0.6	0.5	0.5	
Zinc	µg/L	5		-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc (Filtered)	µg/L	5	40	31	42	6	<5	<5	<5	8	<5	<5	5	<5	35	20	<5	31	<5	<5	<5	<5	<5	<5	
Nutrients																									
Ammonia (as N)	mg/L	0.01	0.04	0.11	0.14	0.07	0.05	0.09	0.11	0.07	0.12	0.09	0.05	0.08	0.1	0.38	0.14	0.15	0.01	0.03	0.02	0.02	0.03	0.02	
Nitrate (as N)	mg/L	0.01	0.1	<0.01	<0.01	<0.01	0.01	<0.01	0.03	0.01	0.01	<0.01	<0.01	0.02	<0.01	1.3	4.61	4.69	17.5	17.5	19	18.7	21.3	15.8	
Nitrite (as N)	mg/L	0.01	0.1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.02	0.05	0.06	0.02	0.02	0.01	0.01	0.01	<0.01	<0.01	<0.01	
Total Kjeldahl Nitrogen	mg/L	0.1	1.8	0.9	0.7	1	0.4	0.4	0.4	0.7	0.6	0.5	0.6	0.5	2.6	1.7	1.8	3.5	3.1	5	5.6	4.8	4.8		
Nitrate & Nitrite (as N)	mg/L	0.01	0.1	<0.01	<0.01	<0.01	0.01	<0.01	0.03	0.01	0.01	<0.01	<0.01	0.02	<0.01	1.32	4.66	4.75	17.8	17.5	19	18.7	21.3	15.8	
Total Nitrogen (as N)	mg/L	0.1	2.6	0.9	0.7	1	0.4	0.4	0.4	0.7	0.6	0.5	0.6	0.5	3.9	6.4	6.6	21.3	20.6	24	24.3	26.1	20.6		
Reactive Phosphorus (as P)	mg/L	0.01	0.02	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.01	<0.01	0.01	<0.01	0.01	0.28	0.26	0.27	0.19	0.19	0.21	0.21	0.21	0.2	0.28	
Total Phosphorus	mg/L	0.01	0.2	0.93	0.04	0.04	<0.01	0.04	<0.01	0.11	0.02	0.01	0.2	<0.01	0.03	0.64	0.28	0.3	0.19	0.2	0.21	0.21	0.84	0.86	

Legend
µg/L = micrograms per litre
mg/L = milligrams per litre
"- " = not reported
LOR = Laboratory Limit of Reporting
COPC = Chemicals of Potential Concern

Appendix B: Field Sheets

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>QW-D3</u>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>12-7-17</u>				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level: <u>12-7-17</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>15G103303</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): <u>4.21</u>	Screen Interval (m):	Chem Kit Model: <u>X21 Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): <u>7.18</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type: <u>(gate/stick up)</u>	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO): <u>(YES)</u>	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	^{etc. etc} E.C. ORC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:30	0			1.88	352.8	5.58	-223.9	20.3	clear, nil odour	
10:33	0.7L			1.26	327.3	5.51	-256.4	20.6		
10:36	1.3L			1.42	323.2	5.52	-248.1	20.7		
10:39	1.8L			1.65	316.8	5.52	-235.8	20.8		
10:41				1.98	314.1	5.54	-226.3	20.8		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>12-7-17</u>		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <i>BK Setty</i>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <i>13/7/17</i>					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>15G103303</i>	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <i>YSI Pro DSS</i>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / (N)</i>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Parameters				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
<i>8:47</i>				<i>7.90</i>	<i>1608</i>	<i>7.89</i>	<i>-31.1</i>	<i>15.6°C</i>	<i>C</i>	<i>NTU</i>	<i>clear,</i>
									<i>Too shallow to profile</i>		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	<i>N/A</i>		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		<i>13/7/17</i>		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: RD1					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 13/7/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 15Q103303	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Ec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9:04	20cm			1.18	948	6.79	-128.9	15.3	C / NTU 772 / 2.3		
									Algae, polluted		
									Not deep enough to profile		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 13/7/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Surface Water

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: KD1A					
Client: Main Roads		Project Location: Beelieri Wetlands		Fieldwork Staff: TW, LF		Sample Date: 13/7/17					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 15G103303		<input type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: 151 ProDSS		<input type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump					
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Waterra					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9:06				1.04	966	6.65	-143.5	15.3	C	NTU 33.2	Slightly turbid.
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 13/7/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>GW-D7</u>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>12-7-17</u>					
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)				
Date of GW Level: <u>12-7-17</u>		Bore Radius (mm):		Chem Kit Serial No.: <u>15G10330</u>		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <u>11.5.81</u>		Screen Interval (m):		Chem Kit Model: <u>YSI Pro DSS</u>		<input checked="" type="checkbox"/> Dedicated		Intake depth:			
Bore Depth (m-pvc): <u>4.67</u>		Casing Radius (mm):		Corrected Redox: <u>Y / N</u>		<input checked="" type="checkbox"/> Disposable		Hydrasleeve Size:			
Depth to Product (m-pvc):		Cover Type (<u>gatic</u> /stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Type:			
Product Thickness (m):		Bore Locked (YES/NO): <u>8</u>		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Sampling Depth (m-pvc):			
		Key Type (if applicable): <u>N/A</u>		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Sampling Start Time: <u>8:47</u>			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SFC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:42	0			1.53	2230	6.78	-222	19.3	2012	Milky	
8:45	1		0.3/min	0.88	2235	6.87	-266	19.7	2009	Metallic smell	
8:48	2		~	0.73	2210	6.90	-295	19.7	1986		
8:51	3		~	0.68	2176	6.91	-303	19.8	1960		
8:54	3.8		~	0.73	2161	6.92	-293	19.7	1943		
8:57	4.5		~	0.78	2132	6.92	-274	19.8	1921		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
<u>N/A</u>		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature			Date				
<u>[Signature]</u>		<u>12/7/17</u>		<u>Tim U [Signature]</u>			<u>12/7/17</u>				
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: D-8				
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 12/7/17	Bore Radius (mm):	Chem Kit Serial No.: 15G103303	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.55	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 12.29	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify) CO ₂		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):								Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	^{E.g.} (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
7:52	0			3.55	310.4	5.25	-156.5	17.8	Slightly turbid, sulphur odour, milky.	
7:55	0.3L			1.31	360.1	5.13	-199.0	18.9		
7:59	1.0L			0.91	375.9	5.14	-188.1	19.4		
8:03	1.5L			0.71	388.1	5.22	-228.5	19.6		
8:07	2.3L			0.89	389.7	5.19	-254.6	19.5		
8:11	3.0L			0.69	394.1	5.18	-265.2	19.6		
8:15	3.5L			0.57	398.7	5.20	-272.7	19.5		
8:19	4.1L			0.62	400.0	5.17	-281.5	19.6		
8:23	4.7L			0.59	402.6	5.18	-289.1	19.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 12/7/17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-05.					
Client: Main Roads		Project Location: Beelieri Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17.					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 12.7.17	Bore Radius (mm):	Chem Kit Serial No.: 15G103303	<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.90m	Screen Interval (m):	Chem Kit Model: YSI Pro 053	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 5.96m	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
Key Type (if applicable):									Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
10:01	0		0.3/min	1.90	981	5.58	-261.2	18.1	854. Turbid, Sulfur odour.		
10:04	1		✓	0.79	978	5.29	-284	18.2	852		
10:07			✓	0.68	974	5.26	-288	18.3	849		
10:10	2.3		✓	0.63	973	5.27	-293	18.3	848		
10:13	3		✓	0.57	970	5.28	-299	18.3	846		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 12-7-17		Checker Name and Signature: Tim W		Date: 12.7.17					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

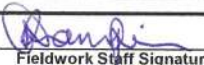
Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T2F					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12-7-17					
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)				
Date of GW Level: 12-7-17		Bore Radius (mm):		Chem Kit Serial No.: KSG103303		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 3.11		Screen Interval (m):		Chem Kit Model: YSI Pro D2		<input checked="" type="checkbox"/> Dedicated		Hydrasleeve Size:			
Bore Depth (m-pvc): 4.17		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		Intake depth:			
Depth to Product (m-pvc):		Cover Type (gatic/slick top):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Type:			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Depth (m-pvc):			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Hydrasleeve Install time:			
								Sampling Start Time:			
								Hydrasleeve in Parameters			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:37	0		0.3/min	3.95	853	6.10	-233	19.6	C	769 Slight sulfur odour, clear	
10:40	0.6			0.73	868	5.95	-262	19.4		774.	
10:43	1.5			0.59	877	5.92	-299	19.3		782.	
10:46	2.2			0.54	889	5.91	-312.3	19.3		792.	
10:49	3			0.53	891	5.90	-322.7	19.2		791.	
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 12/7/17		Checker Name and Signature: Tim W				Date:			
Project Manager Signature		Date:		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T3C			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 12/7/17		Bore Radius (mm):		Chem Kit Serial No.: 15G103303		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 0.8m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Hydrasleeve Size:	
Bore Depth (m-pvc): 5.14m		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable		Intake depth:	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		Hydrasleeve Type:	
Product Thickness (m):		Bore Locked (YES/NO): <input checked="" type="checkbox"/>		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump		Sampling Depth (m-pvc):	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Waterra		Hydrasleeve Install time:	
						<input type="checkbox"/> Other (specify)		Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Hydrasleeve in Parameters	
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRCEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1:11	0			6.77	429.6	5.66	-178.6	17.6	352.4 Slight sulphur odour, clear
1:14	0.6L			1.58	426.1	5.38	-245.4	17.7	408.1 0
1:17	1.4L			0.98	401.4	5.37	-265.7	17.8	343.7
1:20	2.7L			0.89	387.9	5.34	-275.8	17.9	334.6
1:23	3.3L			0.87	384.4	5.33	-276.0	17.9	332.1
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date: 12/7/17		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

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Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T33			
Client: Main Roads		Project Location: Beelir Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 12/7/17		Bore Radius (mm):		Chem Kit Serial No.: 5Q103503		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.82		Screen Interval (m):		Chem Kit Model: 1/51 R10 DSS		<input checked="" type="checkbox"/> Dedicated		Hydrasleeve Size:	
Bore Depth (m-pvc): 6.86		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		Intake depth:	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Hydrasleeve Type:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Sampling Depth (m-pvc):	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Sampling Start Time:	
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5PC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:39	0			2.53	194.7	6.01	-274.7	20.1	170.1 cloudy, very slight sulphur smell
12:42	1 L			0.72	163.0	5.93	-316.5	20.2	147.9
12:45	1.8 L			0.61	154.8	5.95	-328.8	20.2	158.4
12:48	2.5 L			0.57	140.1	5.96	-338.9	20.3	127.2
12:51	3.0 L			0.56	138.1	5.94	-338.7	20.3	125.7
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 12/7/17		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: A1					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 13/7/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
08:25				4.32	6048	3.28	500.9	15.1°C	6518	31.5	clear
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 13/7/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T4C					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 12/7/17		Bore Radius (mm):		Chem Kit Serial No.: 15G103303		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.83		Screen Interval (m):		Chem Kit Model: YSI Pro DS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 10.83		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Hydrasleeve Install time:		Monitoring sequence followed (number in order):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Sampling Start Time:		Hydrasleeve in	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
3:12	0			2.76	505	5.83	-229.3	20.0	456.3	very weak odour, cloudy.	
3:15	1.2L			0.74	496.4	5.95	-304.6	20.0	447.8		
3:18	2.2L			0.62	491.7	5.93	-319.7	19.9	444.0		
3:21	2.7L			0.56	490.8	5.92	-329.9	19.9	443.2		
3:24	3.3			0.56	490.6	5.92	-331.2	19.9	443.2		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

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Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T4B				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 159103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 0.97	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 2.14	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
2:54	0			3.20	617	5.11	-166.6	18.7	C	
2:57	0.7 L			0.81	570	5.14	-244.4	18.8	485.3	Slightly turbid, sulphur odour
3:00	1.6 L			0.59	464.6	5.28	-285.0	19.0	410.0	
3:03	2.4 L			0.53	462.4	5.29	-299.8	19.0	409.4	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 12/7/17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: BH10			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 12/7/17			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 12/7/17	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 1.69	Screen Interval (m):	Chem Kit Model: YSi 910 DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging			
Bore Depth (m-pvc): 5.61	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:	Hydrasleeve out			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			Sampling Start Time:	Parameters			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1:35	0			3.52	579	5.99	-193.9	18.4	507 C
1:37	0.8L			2.52	588	6.00	-196.1	18.5	516 slight 'earthy' odour, turbid, brown stain
1:40	1.8L			2.34	585	5.99	-192.6	18.6	513
1:43				2.25	576	5.99	-192.3	18.5	505
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date: 12/7/17		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

* Surface Water *

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: 425					
Client: Main Roads		Project Location: Beelieri Wetlands		Fieldwork Staff: TW, LF		Sample Date:					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):				Parameters						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC/SC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU C Odour, Colour, Turbidity		
8:58				6.61	1675	7.09	120.3	15.3	8.1	1347	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

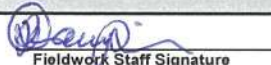
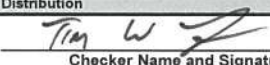
** Surface Water **

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <i>F52</i>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <i>27/7/17</i>					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	<i>SEC</i> (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
<i>14:58</i>				<i>2.66</i>	<i>827</i>	<i>5.63</i>	<i>155</i>	<i>14.8</i>	<i>667</i>	<i>12</i>	<i>Only 15cm deep at static, not deep enough to profile</i>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
<i>[Signature]</i>		<i>27/7/17</i>		_____				_____			
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
_____		_____		_____				_____			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

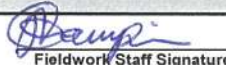
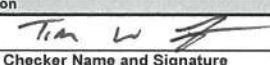
Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-TSE-A			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 27/7/17			
General Bore Information			Parameter Info.		Decontamination				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 18G103363	<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow Pump rate:				
Depth to GW (m-pvc): 3.13	Screen Interval (m):	Chem Kit Model: YSI Pro DS	<input checked="" type="checkbox"/> Dedicated		Intake depth:				
Bore Depth (m-pvc): 3.66	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):				
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:46	0		0.3/min	1.38	728	5.39	-241.3	19.5	649 Clear, strong sulfur odour.
11:49	1.2			0.58	729	5.25	-289.3	19.4	651
11:52	2.1			0.57	730	5.25	-295	19.4	653
11:55	2.8			0.57	729	5.24	-302	19.5	652.
11:58	3.5.			0.56	731	5.23	-305.2	19.4	652
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
 Fieldwork Staff Signature		27/7/17 Date		 Checker Name and Signature		27/7/17 Date			
_____ Project Manager Signature		_____ Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T2F					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 27/7/17					
General Bore Information			Parameter Info.		Decontamination						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 15G103303	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:						
Depth to GW (m-pvc): 2.925	Screen Interval (m):	Chem Kit Model: Y31P0057	<input checked="" type="checkbox"/> Dedicated		Intake depth:						
Bore Depth (m-pvc): 4.16	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Size:						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Hydrasleeve Type:						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved			Sampling Depth (m-pvc):						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):		Monitoring sequence followed (number in order):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
12:06	0		0.3/min	1.47	881	5.85	-226	19.1	782	Clear, sulphur odour	
12:09	0.9			0.70	899	5.84	-300	19.2	797	✓	
12:12	1.8			0.59	917	5.84	-317	19.2	815	✓	
12:15	2.7			0.54	920	5.84	-327	19.2	818	✓	
12:18	3.5			0.54	920	5.83	-332.1	19.1	817	✓	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
 Fieldwork Staff Signature		27/7/17 Date		 Checker Name and Signature			27/7/17 Date				
_____ Project Manager Signature		_____ Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name:		Building Roe 8		Project Number:		60478410		PM Name:		M. O'Rourke		Bore ID:	GW-DS				
Client:		Main Roads		Project Location:		Beeliar Wetlands		Fieldwork Staff:		TW, LF		Sample Date:	27/7/17				
Well Development or Well Sampling Event? (circle)																	
General Bore Information				Parameter Info.				Decontamination		Sampling Method			Hydrasleeve info.				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.:		56103303		<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow Pump rate:			Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model:		YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:			Hydrasleeve Type:				
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N				<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)				<input checked="" type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):		Bore Locked (Y/BS/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:			Hydrasleeve out				
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved									Parameters				
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)				# purge volumes removed:				Total purged volume (L):					
Water Quality Parameters																	
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity								
12:29	0		0.3/min	1.29	1014	5.23	-207	18.2	886 Slightly turbid.								
12:32	1			0.54	1017	5.27	-268.4	18.6	891								
12:35	2			0.48	1016	5.26	-290.3	18.6	891								
12:38	3			0.47	1015	5.26	-299.1	18.5	889								
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)								
Analytes Sampled for:		Bottles Collected				QA/QC Information				Field Comments							
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)						Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic											
Approval and Distribution																	
Fieldwork/Staff Signature				27/7/17		Date				Tim W				27/7/17.		Date	
Project Manager Signature				Date		Distribution: Project Central File											

FQM - Groundwater Sampling and Purging Record

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: BH12				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 27/7/17.				
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination	Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 13.43	Screen Interval (m):	Chem Kit Model: YSI Pro Oss	<input checked="" type="checkbox"/> Dedicated	CO2 Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 17.69	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SAC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
10:00	0		0.3/min.	7.48	223.3	4.80	-26.9	18.6	195.6	Cloudy, yellow stain, milky.
10:03	1		-	8.41	206.3	4.89	-58.8	19.4	184.2	
10:06	1.8			8.63	200.3	4.93	-67	19.6	179.2	
10:09	2.6			8.77	196.8	4.97	-70.5	19.8	177.4	
10:12	3.2			8.88	192.4	5.11	-72.9	19.7	172.9.	
10:15	4			9.01	190.7	5.20	-73.7	19.5	170.3.	
10:18.	5.			9.11	188.4	5.38	-78.9	19.6	168.8	
10:21.	5.8.			9.06	189.8	5.29	-79.3	19.7	190.6.	
10:24.	6.3.			9.04.	190.2	5.26	-79.6	19.7	170.8	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 27/7/17		Checker Name and Signature:		Date: 27/07/17.				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-03			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26/7/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 15G103303	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 4.11	Screen Interval (m):	Chem Kit Model: YSI Pro DSO	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 7.17	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:15	0		0.3	1.70	354.7	5.36	-194.7	20-	322.5. No odour, clear.
11:18	~1L		0.3	1.13	342.2	5.42	-258.3	20.2	311.5
11:21	2		1	1.35	338.9	5.46	-248.3	20.2	306.4
11:24	2.8		1	1.54	333.2	5.47	-241.5	20.2	302.7
11:27	3.6		1	1.60	336.9	5.46	-236.9	20.3	306.4
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 26/7/17		Checker Name and Signature: <i>[Signature]</i>		Date: 26/7/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

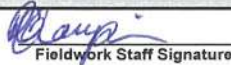
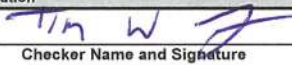
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Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-104				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26-7-17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 26/7/17	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		Hydrasleeve Type:		
Depth to GW (m-pvc): 6.39	Screen Interval (m):	Chem Kit Model: YSI ProDSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 3.92	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gaic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out		Parameters		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)	Sampling Start Time:					
Key Type (if applicable):										
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11:45	0		0.3/min	5.20	211.3	6.32	-151.9	18.3	183.4	Slightly cloudy, no odour.
11:48	1		~	4.85	207.~	6.28	-147.7	18.2	180.1	
11:51	2			4.52	206.2	6.25	-151.8	18.2	179.5	
11:54	3			4.37	205.1	6.23	-154.6	18.2	178.5	
11:57	3.8			4.13	203.6	6.21	-158.~	18.2	177.4	
12-~	4.9			3.86	202.5	6.19	-165.1	18.4	177.1	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 26/7/17		Checker Name and Signature:		Date: 26-7-17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T4B			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26.7.17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination	Sampling Method		Hydrasleeve info.		
Date of GW Level: 26/7/17	Bore Radius (mm):	Chem Kit Serial No.: YSI ProDS	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 0.86	Screen Interval (m):	Chem Kit Model: 15E10B303	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 2.13	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable): N/A	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1:39	0		0.3/min	0.97	438	5.20	-297	18.8	385 Milky, turbid, sulfur odour.
1:42	0.2			0.72	437.2	5.23	-331.6	18.7	384
1:45	2.2			0.63	436.1	5.22	-336	18.7	383
1:48	3.1			0.58	435.6	5.22	-337	18.8	383
1:51	4			0.56	435.4	5.21	-337.5	18.8	384
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA03 - 260717		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 26/7/17		Checker Name and Signature: 		Date: 26/7/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T4C				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26/7/17.				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103353	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 5.75	Screen Interval (m):	Chem Kit Model: YS1 P0035	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 10.83	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Hydrasleeve out Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
2:04	0		0.3	1.64	495.2	5.85	-264.4	20	447.4 Slight sulfur odour	
2:07	1.2			0.71	483	5.90	-330.5	19.9	434. Very light cloudy	
2:10	2.4			0.56	479	5.87	-335.9	19.8	432. appearance.	
2:13	3			0.52	479	5.87	-332	19.8	431.5	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 26/7/17		Checker Name and Signature:		Date: 26/7/17.				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

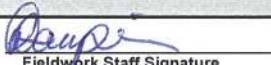
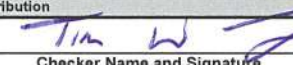
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T3C					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26/7/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination	Sampling Method	Hydrasleeve Info.				
Date of GW Level: 26/7/17	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 0.15	Screen Interval (m):	Chem Kit Model: 751 Dig DS3	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 5.14	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SpC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:48	0		0.31m	2.71	390.4	5.56	-106.7	16.6	329	Slightly cloudy, slight sulfur	
10:51	1.1			1.34	362.7	5.31	-232.6	17.1	306.7		
10:54	2.3			0.73	356.7	5.27	-295.	17.2	304.1		
10:57	2.9			0.62	358.3	5.26	-303	17.1	304.3		
11:00	3.5			0.58	358.9	5.25	-308.5	17.1	305.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 26/7/17		Checker Name and Signature: <i>Tim W</i>		Date: 26/7/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T3B				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26/7/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 26/7/17	Bore Radius (mm):	Chem Kit Serial No.: 56103303	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 1.72	Screen Interval (m):	Chem Kit Model: YSI P/2055	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 8.85	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input type="checkbox"/> Retrieved			Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:12	0		0.3/min	1.55	180	6.17	-199	19.3	157	Cloudy / Milky
10:15	1.6			0.95	148	5.98	-284	19.6	133.5	
10:18	2			0.76	138	5.95	-322.3	19.8	124-	
10:21	2.9			0.67	136.7	5.92	-329	19.8	123	
10:24	3.7			0.62	137	5.90	-333	19.8	123.4	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 26/7/17		Checker Name and Signature: 		Date: 26/7/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: 5H10				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 26/7/17				
General Bore Information		Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)				
Date of GW Level: 1.58	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 1.58	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.62	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
9:50	0	2	0.3/min	3.46	703	6.00	-141	17.7	610 Weak coffee colour	
9:53	0.1			2.94	685	5.53	-149	17.8	591	
9:56	1.9			2.84	681	5.52	-150	17.8	588	
9:59	3.1			2.81	671	5.52	-148	17.8	579	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>GW-D7</u>				
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>26/7/17</u>				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <u>156103303</u>	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	<input checked="" type="checkbox"/> Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): <u>3.75</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSD</u>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): <u>4.48</u>	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):						Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
9:12	0		0.31/m	0.89	2005	6.92	-169	19.5	1768	Very cloudy, milky.
9:15	0.9			0.67	1925	6.83	-323	19.5	1722	~1
9:18	1.8			0.56	1910	6.82	-346.7	19.5	1709	~1
9:21	2.1			0.53	1899	6.81	-351.2	19.5	1697	~1
9:24	2.8			0.55	1944	6.83	-344.7	19.4	1735	~1
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork/Staff Signature: <u>[Signature]</u>		Date: <u>26/7/17</u>		Checker Name and Signature: <u>[Signature]</u>			Date: <u>26/7/17</u>			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>GW-D3</u>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>26/7/17</u>		Well Development or Well Sampling Event? (circle)			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: <u>26/7/17</u>		Bore Radius (mm):		Chem Kit Serial No.: <u>15G103303</u>		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): <u>10.515</u>		Screen Interval (m):		Chem Kit Model: <u>Y61 Pro DSS</u>		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): <u>12.23</u>		Casing Radius (mm):		Corrected Redox: <u>Y / N</u>		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (<u>gate</u> /stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify) <u>CO2</u>		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved						Sampling Start Time:	Hydrasleeve out
Key Type (if applicable):											Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:11	0			2.51	362.0	5.01	-166.7	19.2	321.8 cloudy, sulphur colour		
8:15				10.4041	377.8	5.09	-225	19.6	339 colour		
8:18	1			0.82	379	5.06	-251	19.6	339		
8:21				0.71	384	5.06	-271	19.5	345		
8:24	1.9			0.68	388	5.05	-277.8	19.6	349		
8:27				0.75	395	5.12	-264	19.2	352,		
8:30											
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered: <input checked="" type="checkbox"/>	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA01- 260717 2 extra Amber			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>26/7/17</u>		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <i>Wetlands bridge</i> TBC				
Client: Main Roads		Project Location: Bealiba Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: B6108303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 0	Screen Interval (m):	Chem Kit Model: Y61 PNDSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.13	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SFC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
11:21	0		0.3/min	4.52	396	5.87	-181	15.9	327	Clear
11:24	1			1.00	377	5.54	-251	16.5	316	
11:27	2			0.94	424	5.35	-256	16.6	356	
11:30	3			0.91	444	5.31	-258	16.6	371	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrus	x 60 mL meta's (HND ₂)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (LiClO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 10/8/17	Checker Name and Signature: <i>[Signature]</i>		Date: 10/8/17					
Project Manager Signature: _____		Date: _____	Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1



Hope & Bibra

Project Name: Building Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T415			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 10/8/17		Bore Radius (mm):		Chem Kit Serial No.: 15G103303		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 0.685		Screen Interval (m):		Chem Kit Model: Y61 Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 2.14		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gauge/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRCEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:39	0			2.70	726	6.03	-214	14.8	590 Strong sulphur odour
8:42	0.8L			0.66	719	5.63	-296	16.8	605 turbid, cloudy - yellow
8:45	2 L			0.55	670	5.49	-313	17.2	570
8:48	3.1L			0.52	634	5.43	-322	17.2	539
8:51	4.0L			0.51	619	5.41	-327	17.0	523
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrus	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
<i>[Signature]</i> Fieldwork Staff Signature		10/8/17 Date		<i>[Signature]</i> Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T4C			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: 156463303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc): 5.63	Screen Interval (m):	Chem Kit Model: YSI Pro	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 10.835	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/pick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:57	0		0.3/min	3.30	477	6.19	-225	16.5	404 Clear, slightly turbid
9:00	1		✓	1.35	479	6.01	-319	19.1	425
9:03	2.1		✓	0.98	479	5.98	-337	19.3	427
9:06	3.2		✓	0.97	479	5.98	-343	19.4	428
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 10/8/17	Checker Name and Signature: 		Date: 10/8/17				
Project Manager Signature: _____		Date: _____	Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-406-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>GW-D4</u>				
Client: Main Roads		Project Location: Belliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>10/8/17</u>				
General Bore Information			Parameter Info.		Decontamination					
Date of GW Level: <u>10/8/17</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>15G103303</u>	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:					
Depth to GW (m-pvc): <u>0.10 m</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated		Intake depth:					
Bore Depth (m-pvc): <u>3.90 m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / 0</u>	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailar <input type="checkbox"/> Hydrasleeve					
Depth to Product (m-pvc):	Cover Type (<u>gate</u> /stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved			Hydrasleeve out Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
<u>9:48</u>	<u>0</u>	<u>-</u>	<u>0.4/m²</u>	<u>6.14</u>	<u>182</u>	<u>7.38</u>	<u>-88.7</u>	<u>5.6</u>	<u>150</u> <u>Clear, light sheen on top</u>	
<u>9:51</u>	<u>1.5</u>	<u>-</u>	<u>-</u>	<u>5.10</u>	<u>168</u>	<u>7.17</u>	<u>-178</u>	<u>16.5</u>	<u>141</u>	
<u>9:54</u>	<u>3</u>			<u>4.95</u>	<u>168</u>	<u>7.04</u>	<u>-186</u>	<u>16.5</u>	<u>141</u>	
<u>9:57</u>	<u>4</u>			<u>4.75</u>	<u>168</u>	<u>6.91</u>	<u>-187</u>	<u>16.8</u>	<u>142</u>	
<u>10:00</u>	<u>5.2</u>			<u>4.67</u>	<u>168</u>	<u>6.85</u>	<u>-187</u>	<u>17-</u>	<u>142</u>	
<u>10:03</u>	<u>6.3</u>			<u>4.63</u>	<u>169</u>	<u>6.81</u>	<u>-185</u>	<u>17.2</u>	<u>143</u>	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Val (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Val (H ₂ SO ₄)	x 100 mL Apber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>10/8/17</u>	Checker Name and Signature: <u>Tim D</u>		Date: <u>10/8/17</u>					
Project Manager Signature: _____		Date: _____	Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Baker

Project Name: Buidling Roo 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: 10/8/17				
Client: Main Roads		Project Location: Beekar Wetlands		Fieldwork Staff: TW, LF		Sample Date: GW-D3				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info		Decontamination		Sampling Method				
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 3.865	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 7.154	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (galic stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
8:18	0		0.3/min	1.56	413	6.41	-201	18.1	360	Clear
8:21	1			1.21	364	5.86	-242	19.1	322	
8:24	2			1.92	335	5.82	-221	19.2	298	
8:27	3			1.88	338	5.76	-219	19.3	301	
8:30				1.96	333	5.74	-217	19.4	298	
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HC)	x 60 mL Ferrous	x 80 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 10/8/17	Checker Name and Signature:		Date: 10/9/17					
Project Manager Signature: _____		Date: _____	Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-D7							
Client: Main Roads		Project Location: Baellar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/3/17							
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 15G103303		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc): 3.51		Screen Interval (m):		Chem Kit Model: VSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 4.52		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):			
Depth to Product (m-pvc):		Cover Type (gauge/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Watera		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole						Sampling Start Time:			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):			
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRG _{ED} (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
7:49	0			4.76	650	7.29	-156.7	15.1	C 512 Very cloudy, yellow to brown				
7:52	0.7L			2.17	1449	7.13	-233.1	17.1	1252 nil odour				
7:55	1.2L			1.97	1579	7.14	-235	17.1	1341				
7:58	2.1L			6.4	528	7.53	-165	17.8	457				
8:01	3.2L			6.27	660	7.51	-162	17.8	570				
8:04	4.3L			5.57	712	7.49	-166	17.8	614				
8:08	5.8L			5.07	771	7.47	-168	18.0	668				
8:11	6.4L			4.97	798	7.44	-168	17.8	688				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 50 mL Ferrous		x 60 mL metals (HNO ₃)		N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature		Date		Checker Name and Signature				Date					
Project Manager Signature		Date		Distribution: Project Central File									

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T3B							
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17							
General Bore Information		Parameter Info.		Decontamination		Sampling Method							
Date of GW Level: 10/8/17		Bore Radius (mm):		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:							
Depth to GW (m-pvc): 1.51		Screen Interval (m):		<input checked="" type="checkbox"/> Dedicated		Intake depth:							
Bore Depth (m-pvc): 8.86		Casing Radius (mm):		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Depth to Product (m-pvc):		Cover Type (galic/stick Up):		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
Product Thickness (m):		Bore Locked (YES/NO):		<input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)							
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		Sampling Start Time:							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
10:32	0			2.50	142	7.70	-175	17.3	121 Clear, nil odour				
10:35	1.8L			0.66	143	6.80	-272	19.1	127				
10:38	3.0L			0.61	151	6.45	-287	19.4	140				
10:41	4.1L			0.58	158	6.27	-297	19.4	141				
10:44	5.0L			0.61	159	6.20	-300	19.3	141 Slightly milky				
10:47	6.0L			0.61	159	6.13	-306	19.3	142				
10:50	7.0L			0.60	159	6.11	-311	19.0	141				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
								N/A					
Approval and Distribution													
Fieldwork Staff Signature			Date			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: B410				
Client: Main Roads		Project Location: Boolar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: BG105303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 1.29	Screen Interval (m):	Chem Kit Model: Y51 Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 5.64	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging				
Depth to Product (m-pvc):	Cover Type (galic/sick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Watera	Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved	Parameters							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SVL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC-EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
10:56	0			6.21	489	5.65	-176	16.1	406	Tea-like colour
10:59	1.0L			4.09	474	5.33	-148	16.2	394	
11:02	2.2L			3.82	459	5.34	-196	16.3	382	
11:05	4.0L			3.80	444	5.46	-160	16.4	372	
11:08	4.8L			3.87	457	5.38	-158	16.4	385	
11:11	5.6L			3.84	464	5.30	-158	16.5	388	
11:14				3.84	463	5.28	-157	16.3	388	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		10/8/17		Date		Checker Name and Signature		Date		
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: GW-TSE-A		
Client: Main Roads		Project Location: Baeliar Wellands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.89	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.98	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
11:54	0		0.3/m	5.19	334	5.68	-201	17.5	613	Clear.
11:57	1			1.04	729	5.32	-264	18.7	642	
12:00	2			0.79	730	5.30	-285	18.9	646	
12:03	3			0.57	733	5.31	-293	19.0	649	
12:06	4			0.52	737	5.29	-296	19.0	652	
12:09	5			0.50	737	5.28	-295	19.0	654	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 10/8/17		Checker Name and Signature: Tim W		Date: 10/8/17				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Res 8		Project Number: 60478410		PH Name: M. O'Rourke		Bore ID: GW-05				
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		Hydrasleeve Install time: /		
Depth to GW (m-pvc): 2.52	Screen Interval (m):	Chem Kit Model: Y61 Pro 355	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 3.95	Casing Radius (mm):	Corrected Redox: Y / D	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve out			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Parameters			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SiCFC (mS/cm or $\mu\text{S/cm}$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
12:17	0		0.3L/min	2.20	635	5.37	-221.9	16.6	533	Tea stained slight Sulphur odour.
12:20	0.9L			1.30	614	5.17	-231.6	17.5	527	
12:23	2.0L			1.20	616	5.14	-235.4	17.7	530	
12:26	2.9L			1.13	625	5.14	-236.9	17.6	536	
12:29	3.8L			1.11	639	5.13	-237.6	17.9	543	
12:32				1.04	634	5.13	-239.7	17.5	541	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferric	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 10/8/17		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-406-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: T2F				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.53	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 4.16	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out		Parameters			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:						
	Key Type (if applicable):									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
12:39	0		0.3	4.28	856	5.84	-154	15.9	718	Clear, Strong Sulph.
12:42	1.1		~	0.77	944	5.85	-200	18.3	821	
12:45	2		~	0.70	954	5.86	-297	18.4	844	
12:48	3		~	0.66	966	5.87	-304	18.5	847	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date	Checker Name and Signature		Date					
Project Manager Signature		Date	Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Murdock Paddock

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: D2				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination	Sampling Method		Hydrasleeve Info.		
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.: 156105305	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.61	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.57	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		<input checked="" type="checkbox"/> Gauging	
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SO ₄ EC ⁻ (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
14:15	0			5.80	664	6.71	-156.2	18.2	530	Nil odour, cloudy brown
14:18	1L			5.98	658	6.66	-154.7	18.2	572	
14:21	2L			6.46	657	6.66	-150.5	17.8	567	
14:24	3.2L			6.03	658	6.64	-153.4	17.6	565	
14:27	5.0L			5.60	658	6.63	-152.9	17.6	565	
14:30	6.0L			5.28	658	6.61	-152.4	17.7	567	
14:33	7.0L			5.11	658	6.61	-149.5	17.7	566	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferretus	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: D1					
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff: TW, LF		Sample Date: 10/8/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level: 10/8/17	Bore Radius (mm):	Chem Kit Serial No.:	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc): 2.54 m	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc): 6.57 m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc): No	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):					Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	J.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
2:54	0		0.3 l/min	2.60	577	6.80	-178	19.0	510	Clear, slightly turbid	
2:57	1			1.04	558	5.82	-230	19-	493		
3:00	2			0.96	565	5.86	-239	19-	499		
3:03	3			0.90	568	5.93	-247	19	502		
3:06	3.8			0.87	574	6.02	-251	19-	509		
3:09	4.5			0.86	578	6.01	-255.7	19.1	506		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date	Checker Name and Signature		Date						
Project Manager Signature		Date	Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: BHD				
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff: TW, LF		Sample Date: 9/3/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 13.30m	Screen Interval (m):	Chem Kit Model: Y519to J55	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 17.52m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (galip/stick-up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify) CO ₂		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SiO ₂ (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
15:53	0			5.76	238.4	4.45	-142.3	16.1	199.1	Sandy - cloudy & yellow
15:56	0.5L			2.76	246.5	4.37	-148.7	17.1	209.7	
15:59	1.1L			2.88	246.2	4.38	-150.8	17.2	209.1	
16:02	1.7L			2.99	247.0	4.40	-147.0	17.0	209.5	
16:05	2.0L			3.09	246.5	4.42	-139.0	15.9	203.5	
16:08	2.4L			2.95	244.9	4.40	-128.6	16.7	207.7	
16:12	3.0L			2.68	249.8	4.39	-127.6	17.3	213.2	
16:15	3.5L			2.42	250.6	4.34	-125.1	17.4	214.2	
16:17	4.0L			2.94	249.9	4.34	-120.9	16.9	212.4	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 50 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 µL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <u>GW-D8</u>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <u>9/8/17</u>				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <u>156103503</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <u>YSI ProDSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): <u>12.24</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (pvc stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify) <u>CO₂</u>		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWR (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPe ₅₀ (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
<u>14:26</u>	<u>0</u>			<u>2.54</u>	<u>1148</u>	<u>5.32</u>	<u>-200</u>	<u>18.6</u>	<u>400</u>	<u>Cloudy, sulphur odour</u>
<u>14:29</u>	<u>1.5L</u>			<u>1.12</u>	<u>438</u>	<u>5.38</u>	<u>-267</u>	<u>19.3</u>	<u>390</u>	
<u>14:32</u>	<u>2.6L</u>			<u>0.77</u>	<u>420</u>	<u>5.47</u>	<u>-290</u>	<u>19.5</u>	<u>375</u>	
<u>14:36</u>	<u>3.7L</u>			<u>0.67</u>	<u>416</u>	<u>5.55</u>	<u>-301</u>	<u>19.6</u>	<u>374</u>	
<u>14:39</u>	<u>4.3L</u>			<u>0.64</u>	<u>415</u>	<u>5.59</u>	<u>-311</u>	<u>19.8</u>	<u>375</u>	
<u>14:43</u>	<u>5.2L</u>			<u>0.65</u>	<u>414</u>	<u>5.64</u>	<u>-320</u>	<u>19.9</u>	<u>375</u>	
<u>14:46</u>	<u>6.2L</u>			<u>0.67</u>	<u>412</u>	<u>5.63</u>	<u>-328</u>	<u>19.9</u>	<u>372</u>	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	<u>N/A</u>		<u>Bore volume calculation, bore condition, fate of tubing, redox correction etc</u>			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>9/8/17</u>		Checker Name and Signature: _____		Date: _____				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

** Surface Water **

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: F52			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/8/17			
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156105303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: K1 Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gauge/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):						Parameters		
Calculated bore volume (L):	Includes/excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP-EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm depth			4.13	653	6.32	-187	12.8	6 NTU 500 2.8
	40cm depth			2.84	645	6.30	-205	12.4	489 8.8
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrus	x 60 mL meta's (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

ANZ
FQM - Groundwater Sampling and Purging Record

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** Surface Water **

Project Name: Budling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: B-05-31					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/8/17					
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No. <i>YSI PRODS51</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / N</i>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):						Parameters				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SIC Ec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU		Odour, Colour, Turbidity
	15cm			7.80	1202	7.86	-137	13.8	945	0.5	
	50cm			7.85	1202	7.83	-138	13.7	943	1.0	
	100cm			6.40	1202	7.76	-146	13.7	943	2.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
<i>[Signature]</i>		11/8/17									
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
_____		_____		_____				_____			
Project Manager Signature		Date		Distribution: Project Central File							
_____		_____									

ANZ
FQM - Groundwater Sampling and Purging Record

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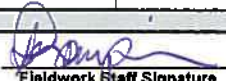
** Surface Water **

Project Name: Buidling Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <i>South 01</i>						
Client: Main Roads		Project Location: Beelilar Wetlands		Fieldwork Staff: TW, LF		Sample Date: <i>11/8/17</i>						
Well Development or Well Sampling Event? (circle)												
General Bore Information		Parameter Info.		Decontamination		Sampling Method						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>154103303</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <i>YSI Pro DSS</i>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:							
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / N</i>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (galc/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters					
Calculated bore volume (L):	Includes/excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):									
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRCEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity	
	<i>15cm</i>			<i>1.10</i>	<i>312</i>	<i>6.45</i>	<i>-196</i>	<i>10.9</i>	<i>228</i>	<i>5.3</i>	<i>Not deep enough to profile.</i>	
Acceptable Parameter Range:		±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)					
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Feped ⁹	x 60 mL metals (HNO ₃)	<i>N/A</i>			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
<i>[Signature]</i>		<i>11/8/17</i>										
Fieldwork Staff Signature		Date	Checker Name and Signature			Date						
Project Manager Signature		Date	Distribution: Project Central File									

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FQM - Groundwater Sampling and Purging Record

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Surface Water

Project Name: Buidling Roe B		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: A3					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/8/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 154103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSL P035	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):							Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SYL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR Co. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	15cm			1.17	347	6.08	-169	11.0	255	11	Not deep enough to profile.
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrus	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
		11/8/17		_____			_____				
Fieldwork Staff Signature		Date		Checker Name and Signature			Date				
_____		_____		_____			_____				
Project Manager Signature		Date		Distribution: Project Central File							
_____		_____									

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FQM - Groundwater Sampling and Purging Record

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** Surface Water **

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: RD1A					
Client: Main Roads		Project Location: Beelior Wellands		Fieldwork Staff: TW, LF		Sample Date: 11/3/17					
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	<input checked="" type="checkbox"/> Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: Y51 P2 D55	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: X / (N)	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SV _{0.5} (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	Surface			0.90	731	6.57	-208	13.1	566	31	Not deep enough to profile.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 50 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

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** Surface Water **

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: RDI							
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/3/17							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.:		<input type="checkbox"/> Decontaminated							
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model:		<input type="checkbox"/> Dedicated							
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gabic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP EXC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C OTC		Odour, Colour, Turbidity		
	13cm			1.40	741	6.73	-127	13.0	571	0.5	Not deep enough to profile		
Acceptable Parameter Range:								± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferraris	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic									
Approval and Distribution													
Fieldwork Staff Signature		Date		Checker Name and Signature		Date							
Project Manager Signature		Date		Distribution: Project Central File									

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FQM - Groundwater Sampling and Purging Record

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** Surface Water **

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: A12					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/18/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 15G103303	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: Y51 10 D55	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	DO _{SEC} (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	10um			0.68	482	6.62	-271	13.8	769	42	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% (turbidity (if using a turbidity meter))		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 11/18/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

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Surface Water

Project Name: Building Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: A1E					
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/8/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: 751 Pro DS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (patic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWM (m-pvc)	Pump Rate	DO (ppm or mg/L)	SpEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	150m			0.73	1305	6.59	-278	12.4	990	96.8	* Not deep enough to per. le.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Commets			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		11/8/17		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

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** Surface Water*

Project Name: Buidling Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: <i>10LWS-102</i>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW, LF		Sample Date: <i>11/18/17</i>					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>154103303</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <i>YSI Pro DSS</i>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / N</i>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (Specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)			Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	<i>15cm</i>			<i>5.38</i>	<i>3.30</i>	<i>6.02</i>	<i>-148</i>	<i>15.7</i>	<i>2574</i>	<i>62</i>	<i>Not deep enough to profile</i>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Val (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	<i>N/A.</i>			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Val (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
<i>[Signature]</i>		<i>11/21/17</i>									
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

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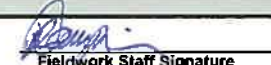
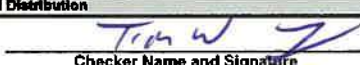
#Surface Water#

Project Name: Buiding Roe 8		Project Number: 60478410		PM Name: M. O'Rourke		Bore ID: A1					
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff: TW, LF		Sample Date: 11/13/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 156103303	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:		Hydrasleeve out Parameters				
Key Type (if applicable):											
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP Ec (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			2.95	2826	6.26	-176	15.2	2287	23.5	
	40cm			0.83	4742	6.13	-215	15.1	3875	27	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							


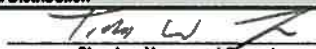
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Bealier Wetlands		Fieldwork Staff: Tim W		Bore / Location ID: BH10			
						Sample Date: 24/8/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H10456	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc): 1.295	Screen Interval (m):	Chem Kit Model: YSI P/O D30	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.65	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging			
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time: Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:39	1		0.3	1.77	507	4.59	158	17.8	Turbid, brown, lots of organic content.
11:42	2.2			1.37	502	4.68	188	17.9	
11:45	3.4			1.27	495	4.69	199	18.0	
11:48	4.6			1.20	490	4.69	200.6	18.1	
11:51	6-			1.10	489	4.69	201.3	18.2	
11:54	6.8			1.01	491	4.69	201-	18.3	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 24/8/17		Checker Name and Signature: 		Date: 24/8/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: T4B,		Sample Date: 24/8/17.								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)							
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff: TW RC								
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve Info.					
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No: 17410156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:					
Depth to GW (m-pvc): 0.59	Screen Interval (m):	Chem Kit Model: YSI ProDSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 2.135	Casing Radius (mm):	Corrected Redox: Y / 0	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (gate/tick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:					
	Key Type (if applicable):				Hydrasleeve in/out					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):	Monitoring sequence followed (number in order):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
12:47	2		0.3/min	2.07	51	5.24	13.	18.5	512	Turbid, sulfur smell
12:50	3			1.78	510	5.27	-11.7	18.6	448	
12:53	4.2			1.40	512	5.26	-22.7	18.6	450	
12:56	6.			1.17	514	5.26	-31.7	18.6	454	
12:59	7			1.02	516	5.26	-40.6	18.6	453	
1:02	8.2			0.91	517	5.26	-46.3	18.7	454	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
 Fieldwork Staff Signature			24/8/17 Date		 Checker Name and Signature			24/8/17 Date		
_____ Project Manager Signature			_____ Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beel'ar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: T2F			
						Sample Date: 24/8/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H10156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.285	Screen Interval (m):	Chem Kit Model: Y61 Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 4.165	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve n		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify):		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:13	0		0.31m-3:30	3.30	752	6.08	12.7	17.1	C 774
10:16	2		PHONE CALL - MISSED SAMPLING						
10:19	3			0.53	971	5.21	9.2	18.2	844
10:22	4			0.47	974	5.91	9.3	18.3	850
10:25	5			0.44	975	5.90	9.4	18.4	853
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 24/8/17		Checker Name and Signature:		Date: 24/8/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>	Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: GW-TSE-A			
						Sample Date: 24/8/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.66	Screen Interval (m):	Chem Kit Model: XSL Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 3.6	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:32	0		0.3	1.43	805	5.24	65	18.5	767 Clear, sulfur smell
10:35	1.2			0.75	816	5.12	66	18.8	719
10:38	2.4			0.63	818	5.09	61	18.9	724
10:41	3.6			0.52	821	5.08	50.7	19.1	728
10:44	4.8			0.51	820	5.08	47-	19.1	728
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrus	1 x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		1 x 40 mL Vial (P ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL P astic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 24/8/17		Checker Name and Signature:		Date: 24/8/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					


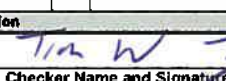
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: GW-D5					
						Sample Date: 24/8/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17M0156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:					
Depth to GW (m-pvc): 2.3m	Screen Interval (m):	Chem Kit Model: YS Pro 650	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc): 5.95m	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):					Hydrasleeve out Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
10:52	0		0.3	6.47	351	5.38	113.5	18.1	624	Slightly turbid	
10:55	1.2			1.84	748	5.35	101.3	18.3	649	NO odour.	
10:58	2.4			1.71	759	5.36	100.7	18.4	662		
11:01	3.6			1.59	774	5.37	100.4	18.5	678		
11:04	4.8			1.56	778	5.37	100.3	18.6	683		
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL meta's (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: [Signature]		Date: 24/8/17		Checker Name and Signature: [Signature]		Date: 24/8/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: T3C				
						Sample Date: 24/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 24/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H10156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 0.00	Screen Interval (m):	Chem Kit Model: VSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 5.12	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify):		Sampling Start Time:				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Relieved				Hydrasleeve out:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	BWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	DO/C. (mB/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
11:12	0.5		0.31/min	1.76	380	5.53	45.6	17.2	322	Clear
11:15	1.8			1.39	372	5.46	47.1	17.2	317	
11:18	3			1.27	372	5.42	52.3	17.2	316	
11:21	4			0.91	370.1	5.38	56.4	17.2	315.5	
11:24	5			0.75	368	5.36	61.1	17.3	314.7	
11:27	6.1			0.67	367	5.36	62.3	17.4	314.5	
11:30	7			0.64	367	5.36	63.3	17.4	314.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	<input checked="" type="checkbox"/> x 40 mL Via (HCl)	<input checked="" type="checkbox"/> x 60 mL Ferrous	<input checked="" type="checkbox"/> x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		<input checked="" type="checkbox"/> x 40 mL Vial (H ₂ SO ₄)	<input checked="" type="checkbox"/> x 100 mL Amber	<input checked="" type="checkbox"/> x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 24/8/17		Checker Name and Signature: 		Date: 24/8/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: <u>Tim RC</u>		Bore / Location ID: <u>GW-D8</u>					
						Sample Date: <u>24/8/17</u>					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: <u>24/8/17</u>		Bore Radius (mm):		Cham Kit Serial No.: <u>174101486</u>		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): <u>310.34</u>		Screen Interval (m):		Chem Kit Model: <u>YSI Pro DSS</u>		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): <u>102.82</u>		Casing Rad Us (mm):		Corrected Redox: <u>Y / N</u>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc): <u>12.52</u>		Cover Type (<u>Stick</u> stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO): <input checked="" type="checkbox"/>		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		
15:47	0.5			4.62	261	5.30	68	18.7	235.2	Milky, Sulphur smel.	
15:50	1.5			2.56	603	5.25	57.8	19.3	538		
15:53	2.5			2.12	599	5.27	47.1	19.6	535		
15:56	3.4			1.89	586	5.28	40.2	19.6	526		
15:59	4.2			1.81	577	5.29	35.5	19.7	517		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>24/8/17</u>		Checker Name and Signature: <u>Tim W</u>		Date: <u>24/8/17</u>					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PI Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: BH12				
						Sample Date: 24/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 24/8/17		Chem Kit Serial No.: 17410156		<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:				
Depth to GW (m-pvc): 13.06		Chem Kit Model: 751 Pm Dss		<input checked="" type="checkbox"/> Dedicated		Intake depth:				
Bore Depth (m-pvc): 17.47		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve				
Depth to Product (m-pvc)		Cover Type (gatic/stick up)		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
Product Thickness (m)		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)				
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	BWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC (mg/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
14:38	1		0.3/min	8.23	242	4.59	276	20.9	224	Milky
14:41	2			7.59	243	4.45	302	20.9	224.2	
14:44	3.2			7.16	242	4.38	317	20.9	223.5	
14:47	4.2			6.97	242	4.35	323	20.9	223.3	
14:50	5.2			6.79	241.6	4.33	329	21-	223.1	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 24/8/17		Checker Name and Signature:		Date: 24/8/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	GW-D4		
Sample Date:	25/8/17		

Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGrathar
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:	TW RC

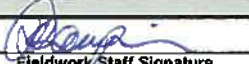
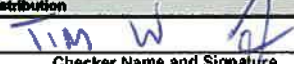
General Bore Information		Parameter Info.		Decontamination	Sampling Method		Hydrasleeve Info.	
Date of GW Level: 25/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 0.10m	Screen Interval (m):	Chem Kit Model: YSI Pro Dss	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc): 3.92m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type: (circle)	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable):						Parameters	

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S _o C. (mg/cm or µg/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:04	0			2.70	103	6.35	126	16.2	90 Clear, no odour
8:07	1.8			2.07	216.5	6.05	157	17.4	185.2
8:10	3			1.90	215.8	6.03	166.8	17.5	184.9
8:13	4.5			2.05	216	6.04	172	17.6	185

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (+NO ₂)			Bore volume calculation, bore condition, fate of tubing, redox correction etc
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic			

Approval and Distribution			
	25/8/17		25/8/17
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ
FQM - Groundwater Sampling and Purging Record


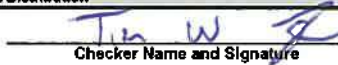
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Man Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: T4C			
						Sample Date: 25/8/17			
						Well Development or Well Sampling Event? (circle)			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 25/8/17		Bore Radius (mm):		Chem Kit Serial No.: 17410156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 3.43		Screen Interval (m):		Chem Kit Model: NSI Pro D55		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 10.83		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Waterra			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sp. Cond. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:25	0.5		0.3/min	3.51	463	6.07	50.4	17.0	410. Slightly turbid, no odour
8:28	1.5			2.01	499	6.02	28.5	18.6	438
8:31	3			1.82	502	6.01	28.0	18.7	441
8:34	4			1.61	503	6.00	27.9	18.7	443
8:37	5			1.35	504	5.98	28.0	18.7	443
8:40	6			1.18	504	5.97	28.4	18.8	444
8:43	7			1.11	504	5.97	28.5	18.9	445
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	<input checked="" type="checkbox"/> x 40 mL Vial (HCl)	<input checked="" type="checkbox"/> x 60 mL Ferrous	<input checked="" type="checkbox"/> x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		<input checked="" type="checkbox"/> x 40 mL Vial (H ₂ SO ₄)	<input checked="" type="checkbox"/> x 100 mL Amber	<input checked="" type="checkbox"/> x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: D2				
						Sample Date: 23/8/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info		Decontamination		Sampling Method				
Date of GW Level: 23/8/17		Bore Radius (mm):		Chem Kit Serial No.: 17A10158		Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 1.60m		Screen Interval (m):		Chem Kit Model: YSI PRO DSS		Hydrasleeve Size:				
Bore Depth (m-pvc): 5.57m		Casing Radius (mm):		Corrected Redox: Y / N		Hydrasleeve Type:				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		Sampling Depth (m-pvc):				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		Hydrasleeve Install time:				
		Key Type (if applicable):				Sampling Start Time:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mg/lom or µg/lom)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
13:35	1		0.3/lm	3.16	663	6.19	102.5	18.2	577	Slightly turbid, no odour.
13:38	2.1			2.58	660	6.16	116.4	18.1	573	
13:41	3.2			2.32	656	6.13	123.5	18.1	570	
13:44	4.4			2.05	654	6.12	128.2	18.1	568	
13:47	5.6			1.83	652	6.12	130.2	18.1	567	
13:50	7			1.73	649	6.11	131.6	18.2	564	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 03/8/17		Checker Name and Signature: 		Date: 23/8/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: D1				
						Sample Date: 23/08/17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 23/8/17	Bore Radius (mm):	Chem Kit Serial No.: 17H01156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 2.435	Screen Interval (m):	Chem Kit Model: YSL FC 203	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 6.56	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Monitoring sequence followed (number in order):				
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Sampling Depth (m-pvc):		Gauging			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:		Hydrasleeve in:				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved		Sampling Start Time:		Hydrasleeve out:				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
2:10	0		~0.4	4.35	285	5.89	142	18.2	483	No odour
2:13	1.2			1.52	589	5.68	174	18.7	548	
2:16	2.6			1.27	588	5.66	180	18.9	520	
2:19	3.9			1.10	587	5.64	183	19.2	522	
2:22	5.			0.88	585	5.64	184	19.6	524	
2:25	6.			0.85	584	5.64	184	19.7	525	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 23/8/17		Checker Name and Signature:		Date: 23/8/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beoliar Wetlands		Fieldwork Staff: <i>TW RC</i>		Bore / Location ID: <i>A1</i>					
				Sample Date: <i>23/8/17</i>		Well Development or Well Sampling Event? (circle)					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>17H01156</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <i>YSI Pro DSS</i>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / 0</i>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):					Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	<i>15cm</i>			<i>0.2</i>	<i>2556</i>	<i>6.92</i>	<i>-153</i>	<i>15.8</i>	<i>2108</i>	<i>20.4</i>	
	<i>50cm</i>			<i>0.15</i>	<i>2718</i>	<i>6.72</i>	<i>-155</i>	<i>15.8</i>	<i>2240</i>	<i>31</i>	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	<input type="checkbox"/> x 40 mL Val (HCl)	<input type="checkbox"/> x 60 mL Ferrous	<input type="checkbox"/> x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		<input type="checkbox"/> x 40 mL Val (H ₂ SO ₄)	<input type="checkbox"/> x 100 mL Amber	<input type="checkbox"/> x 250 mL Plastic							
Approval and Distribution											
<i>[Signature]</i>		<i>23/8/17</i>									
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff: <i>Two R</i>		Bore / Location ID: <i>E52</i>				
						Sample Date: <i>23/3/17</i>				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: <i>17H10156</i>		<input type="checkbox"/> Decontaminated				
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: <i>YSI Pro DSS</i>		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: <i>Y / N</i>		<input type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (microMhos μ S/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity	
	<i>15cm</i>			<i>1.14</i>	<i>739</i>	<i>6.23</i>	<i>108</i>	<i>14.0°</i>	<i>584</i>	<i>17.8</i>
	<i>50cm</i>			<i>0.83</i>	<i>734</i>	<i>6.23</i>	<i>107</i>	<i>13.6°</i>	<i>575</i>	<i>12.3</i>
Acceptable Parameter Range:				$\pm 10\%$	$\pm 3\%$	± 0.05	± 10 mV	± 0.2 °C	$\pm 10\%$ turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	<i>1</i> x 40 mL Vial (HC)	<i>1</i> x 60 mL Ferrous	<i>1</i> x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		<i>1</i> x 40 mL Vial (H ₂ SO ₄)	<i>1</i> x 100 mL Amber	<i>1</i> x 250 mL Plastic						
		<i>1</i> <i>(Sample)</i>								
Approval and Distribution										
<i>[Signature]</i> Fieldwork Staff Signature		<i>23/3/17</i> Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

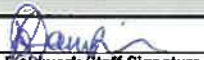
Q4AN(EV)-405-FM1

Project Name: Building Roe S		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: F54A		Sample Date: 23/8/17			
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 1746156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/>	<input type="checkbox"/> Other (specify):		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SREO: (mV/cm or μS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15m			1.13	736	6.25	98	13.9°	580	14	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HC)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
		<i>Chlorophyll II</i>									
Approval and Distribution											
		23/8/17		_____				_____			
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
_____		_____		Distribution: Project Central File							
Project Manager Signature		Date									

ANZ

FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: AIN											
Project Name: Building Roe B		Project Number: 60478410									
PM Name: Chris McGraghan		Sample Date: 23/8/17									
Client: Main Roads		Project Location: Beelihar Wetlands									
Fieldwork Staff: TW RC		Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.	Decontamination	Sampling Method		Hydrasleeve info.					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 174101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Decontaminated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gotic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
Key Type (if applicable):							Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.18	1085	6.6	-135	13.3	840	160	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		Wongphyll									
Approval and Distribution											
 Fieldwork Staff Signature		23/8/17		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Boellar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: 1245-N2					
						Sample Date: 23/8/17					
						Well Development or Well Sampling Event? (circle)					
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101.56	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc)	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Watera	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Colour, Colour, Turbidity
	95cm			0.34	2339	7.05	-127	16.2	1947	36	
	60cm			0.16	2907	7.06	-147	15.6	2303	52	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HC)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 23/8/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: South S1					
Date of GW Level:		Chem Kit Serial No.: 17H10156		<input checked="" type="checkbox"/> Decontaminated		Sample Date: 23/8/17					
Depth to GW (m-pvc):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Well Development or Well Sampling Event? (circle)					
Bore Depth (m-pvc):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		Low Flow: Pump rate:					
Depth to Product (m-pvc):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		Intake depth:					
Product Thickness (m):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Bailer		<input checked="" type="checkbox"/> Hydrasleeve					
Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterra					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve Size:					
Total purged volume (L):		Monitoring sequence followed (number in order):		Hydrasleeve Type:		Sampling Depth (m-pvc):					
		Gauging		Hydrasleeve Instal time:		Hydrasleeve in					
		Parameters		Sampling Start Time:		Hydrasleeve out					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP-EC (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			0.56	329	6.26	119	11.8	C	NTU	
									247	119	Too shallow to profile
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature			Date			Checker Name and Signature			Date		
Project Manager Signature			Date			Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:		<input type="checkbox"/>	Groundwater:		<input checked="" type="checkbox"/>						
Bore / Location ID:		A3									
Project Name:		Building Roe 8	Project Number:		80478410						
Client:		Main Roads	PM Name:		Chris McGraghan						
Project Location:		Beelair Wetlands	Fieldwork Staff:		TW RC						
Sample Date:		23/6/17									
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination	Sampling Method						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size: Monitoring sequence followed (number in order):						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated	Intake depth:							
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Hydrasleeve Type:						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Watterra	Sampling Depth (m-pvc):						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:						
	Key Type (if applicable):	<input type="checkbox"/> Retrieved			Sampling Start Time:						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (-mM/cm or μ S/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.29	351	5.95	60	11.8	263	157	
Acceptable Parameter Range:											
		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected				QA/QC Information				Field Comments	
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 50 mL metals (HNO ₃)						Bore volume calculation, bore condition, fate of tubing, redox correction etc	
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		7 (H ₂ O) (L)									
Approval and Distribution											
_____ Fieldwork Staff Signature		23/6/17 Date		_____ Checker Name and Signature		_____ Date					
_____ Project Manager Signature		_____ Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID:		RD1A									
Project Name: Building Roe 8		Project Number: 60478410									
Client: Main Roads		Project Location: Beechler Wetlands									
PM Name: Chris McGraghan		Fieldwork Staff: TW RC									
Sample Date: A 23/8/17		Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info		Decontamination		Sampling Method		Hydrasleeve info			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Sampling Depth (m-pvc):			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SpEC: (mMolm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odeur, Colour, Turbidity		
	15cm			0.47	857	6.55	58	14.3	68	124	200
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature		23/8/17		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW RC		Bore / Location ID: BL05-B1					
						Sample Date: 23/8/17					
						Well Development or Well Sampling Event? (circle)					
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 174101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (get/c/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Hydrasleeve out Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			5.3	1176	7.61	137	15.8	969	8-2	
	100cm			5.17	1176	7.59	86.7	15.7	969	20	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	2 x 40 mL Vial (HCl)	3 x 60 mL Ferrous	2 x 50 mL meta's (HNO ₃)	2 extra amber WQA02 duplicate.		Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		2 x 40 mL Vial (H ₂ SO ₄)	3 x 100 mL Amber	2 x 250 mL Plastic							
		2 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beoliar Wetlands		Fieldwork Staff: <i>TW RC</i>		Bore / Location ID: <i>A25</i>					
				Sample Date: <i>23/8/17</i>		Well Development or Well Sampling Event? (circle)					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>17A10156</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <i>X61 Pro DSS</i>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: <i>Y / N</i>	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (col/100m or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	<i>15cm</i>			<i>5.39</i>	<i>1176</i>	<i>7.61</i>	<i>145</i>	<i>15.8</i>	<i>970</i>	<i>38</i>	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
<i>[Signature]</i> Fieldwork Staff Signature		<i>23/8/17</i> Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	RD1		
Sample Date:	23/8/17		
Well Development or Well Sampling Event? (circle)			

Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGrath
Client:	Main Roads	Project Location:	Beeilar Wetlands	Fieldwork Staff:	TW RC

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	7H 101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro 753	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>		<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gauge/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install Time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify):		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):					

Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S _E -E _C (random or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.37	857	6.56	58	14.3	679	143	Too much rubbish to profile.

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic		
		1 x Chlorophyll				

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

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Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: <u>A2</u>		Sample Date: <u>23/8/17</u>							
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)						
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff: <u>TW RC</u>							
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Project (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Water:ra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m)	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC-E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	<u>15cm</u>			<u>5.9</u>	<u>1174</u>	<u>7.63</u>	<u>144</u>	<u>16.1</u>	<u>974</u> <u>NTU</u> <u>13.5</u>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
		1 x Chlorophyll							
Approval and Distribution									
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>23/8/17</u>		Checker Name and Signature: _____			Date: _____		
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: <i>Two RC</i>		Bore / Location ID: <i>A1E</i>						
				Sample Date: <i>23/8/17</i>		Well Development or Well Sampling Event? (circle)						
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: <i>17H101156</i>		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: <i>YSI Pro DSS</i>		<input type="checkbox"/> Ded caps		Intake depth:		Monitoring sequence followed (number in order):		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: <i>Y / N</i>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gat.c/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Instal. time:		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve in		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve out		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	<i>15cm</i>			<i>0.19</i>	<i>1127</i>	<i>6.69</i>	<i>-222</i>	<i>15.3°</i>	<i>C</i>	<i>NTU</i>	<i>918</i>	<i>85.2</i>
	<i>40cm</i>			<i>0.13</i>	<i>1114</i>	<i>6.70</i>	<i>-231</i>	<i>14.4°</i>			<i>889</i>	<i>7.9</i>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	<i>1</i> x 40 mL Vial (HCl)	<i>1</i> x 60 mL Ferrous	<i>1</i> x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		<i>1</i> x 40 mL Vial (H ₂ SO ₄)	<i>1</i> x 120 mL Amber	<i>1</i> x 250 mL Plastic								
		<i>1</i> x <i>Chlorophyll</i>										
Approval and Distribution												
Fieldwork Staff Signature: <i>[Signature]</i>		Date: <i>23/8/17</i>		Checker Name and Signature: _____				Date: _____				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

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General Bore Information					Parameter Info		Decontamination	Sampling Method		Hydrasleeve info.	
Project Name: Building Roe 8					Project Number: 60478410		PM Name: Chris McGrathan	Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: B2 Setty	
Client: Main Roads					Project Location: Beelair Wetlands		Fieldwork Staff: TW RC	Sample Date: 23/8/17		Well Development or Well Sampling Event? (circle)	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17410156	<input type="checkbox"/> Decantaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:			Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			Gauging		
Depth to Product (m-pvc):	Cover Type (gadic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:			Hydrasleeve in Parameters	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):										
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mB/c or µS/cm)	pH	Redox (mV)	Temp °C	NTU	C	Odour, Colour, Turbidity
	15cm			5.39	117.4	7.56	92.5	16.0°	3.5		9.73
	50cm			5.53	117.4	7.59	102	16.0°	10.2		9.72
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Fezods	x 60 mL metal (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc. Profile only.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 µL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: [Signature]			Date: 23/8/17	Checker Name and Signature:			Date:				
Project Manager Signature:			Date:	Distribution: Project Central File							

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Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Bealier Wetlands		Fieldwork Staff:						
Date of GW Level: 6/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156						
Depth to GW (m-pvc): 0.05m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS						
Bore Depth (m-pvc): 5.13m		Casing Radius (mm):		Corrected Redox: Y / N						
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)						
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole						
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						
				Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
15:24	0			1.91	746	5.19	78.5	17.1	652	Tanin stained, slight sulphur odour
15:27	1.0			0.30	459.8	5.28	38.1	17.1	326.9	
15:30	2.0			0.18	405.3	5.29	29.5	17.1	343.3	
15:33	3.0			0.13	386.0	5.29	23.5	17.1	326.2	
15:36	4.0			0.11	374.7	5.30	20.3	17.1	318.0	
15:39	5.0			0.10	373.5	5.30	19.1	17.1	317.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

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Surface Water: Groundwater:

Bore / Location ID: T3B

Sample Date: 6/19/17

Well Development or Well Sampling Event? (circle)

Project Name: Building Roc B	Project Number: 6D478410	PM Name: Chris McGraghan
Client: Main Roads	Project Location: Boellar Wetlands	Fieldwork Staff: <u>RJ</u>

General Bore Information		Parameter Info.		Decontamination	Sampling Method		Hydrasleeve Info.	
Date of GW Level: <u>6/19/17</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): <u>1.43m</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:	Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): <u>8.85m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):	Cover Type (gate/click up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
Key Type (if applicable):							Parameters	
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):				

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SE-EO (mMol/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:49	0			1.64	191.1	5.83	20.3	22.0	178.7	Slightly cloudy
14:52	1.1L			0.53	193.7	5.81	40.9	20.2	176.4	
14:55	2.0L			0.45	195.7	5.80	41.3	20.3	178.1	
14:58	3.0L			0.32	196.4	5.79	33.1	20.3	178.8	
15:01	4.0L			0.25	196.3	5.79	30.8	20.3	178.6	
15:04	5.0L			0.17	195.8	5.79	25.8	20.3	178.0	
15:07	6.0L			0.15	195.6	5.79	24.6	20.3	177.7	

Acceptable Parameter Range: $\pm 10\%$ $\pm 3\%$ ± 0.05 ± 10 mV ± 0.2 °C $\pm 10\%$ turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A	Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	6/19/17	_____	_____
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
_____	Date	Distribution: Project Central File	

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Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:						
Bore / Location ID: GW-DS		Sample Date: 6-9-17		Well Development or Well Sampling Event? (circle)						
Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
General Bore Information		Parameter Info.		Decontamination						
Date of GW Level: 6/9/17	Bore Radius (mm):	Chem Kit Ser. al No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:					
Depth to GW (m-pvc): 2.26m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Monitoring sequence followed (number in order):					
Bore Depth (m-pvc): 5.95m	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging					
Depth to Product (m-pvc):	Cover Type (rat/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time: Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time: Hydrasleeve out					
	Key Type (if applicable):				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPCEG (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
14:00	0			4.26	874	5.75	43.0	22.2	798	Weak tea colour, slight sulphur odour
14:03	1.0L			0.50	958	5.40	34.7	18.9	846	
14:06	2.0L			0.25	970	5.40	30.6	18.9	856	
14:09	3.0L			0.17	971	5.40	25.0	18.7	855	
14:12	4.0L			0.15	972	5.41	21.0	18.7	854	
14:15	4.9L			0.12	972	5.42	15.3	18.8	857	
14:18	5.8L			0.11	971	5.43	11.8	18.7	854	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrous	x 80 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork/Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe B		Project Number: 6047B41D		PM Name: Chris McGrathan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T2F			
						Sample Date: 6/9/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 6/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.25m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 4.16m		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick/rod):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SCOR: (mg/lom or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:34	0			1.48	928	5.84	-13.8	18.5	830 Slightly turbid, slight sulphur
13:37	1.2L			0.40	930	5.86	-44.3	19.0	824 clear.
13:40	2.3L			0.25	924	5.87	-50.3	19.2	822
13:43	3.1L			0.20	922	5.87	-52.1	19.3	820
13:46	4.0L			0.16	924	5.87	-53.9	19.4	825
13:49	4.9L			0.14	923	5.87	-54.3	19.4	824
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Fernox	x 60 mL metal (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 6/9/17		Checker Name and Signature: _____		Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building R00 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A				
Date of GW Level: 6/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 6/9/17				
Depth to GW (m-pvc): 2.68m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)				
Bore Depth (m-pvc): 3.72m		Casing Radius (mm):		Corrected Redox: Y / N		Monitoring sequence followed (number in order):				
Depth to Product (m-pvc):		Cover Type (stick up):		(The correction to apply is probe dependent) F1 Other (specify)		Gauging				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		Hydrasleeve instal time:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve out Parameters				
Key Type (if applicable):		Retrieved		F1 Other (specify)		Sampling Start Time:				
Total purged volume (L):										
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC Ec. (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
13:01	0			0.70	1114	4.60	43.8	19.4	978	Slightly turbid, slight sulphur odour.
13:04	1.2L			0.27	1105	4.61	27.0	19.6	992	
13:07	2.1L			0.35	1131	4.63	16.0	19.5	1021	
13:10	3.0L			0.19	1110	4.68	3.1	19.4	990	
13:13	4.0L			0.16	1109	4.70	-4.8	19.4	990	
13:16	5.1L			0.14	1100	4.73	-13.7	19.4	983	
13:19	6.0L			0.11	1100	4.71	-20.6	19.4	981	
13:22	7.0L			0.10	1093	4.73	-21.2	19.4	978	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (MNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: Q4AN(EV)-405-FM1 BHD				
						Sample Date: 7/9/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 13.08		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 17.43		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (radio stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify) CO2				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SCCOP (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
15:05	0			9.55	245	4.78	202	22	229	Very cloudy, slightly yellow
15:09	1.0L			5.16	257.6	4.35	286.7	20.9	237.4	
15:03	1.5L			5.08	257.7	4.38	303.0	20.7	236.3	
15:18	3.0L			5.40	257.0	4.41	309.4	20.6	235.5	
15:22	3.8L			5.76	255.1	4.45	310.3	20.7	234.2	
15:25	4.6			6.01	254.7	4.47	311.6	20.7	233.1	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 7/9/17		Checker Name and Signature:		Date: 7/9/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Bldg Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		<input type="checkbox"/> Surface Water: <input checked="" type="checkbox"/> Groundwater:			
Client: Main Roads		Project Location: Baalier Wetlands		Fieldwork Staff:		Bore / Location ID: GW-07 Sample Date: 7/9/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated <input checked="" type="checkbox"/> Dedicated <input checked="" type="checkbox"/> Disposable <input type="checkbox"/> Other (specify)			
Depth to GW (m-pvc): 3.375		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Low Flow: Pump rate:			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		Intake depth:			
Depth to Product (m-pvc):		Cover Type (gall/stick up):		(The correction to apply is probe dependent):		<input checked="" type="checkbox"/> Bailler <input type="checkbox"/> Hydrasleeve <input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Key Type (if applicable):						<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC ₅ (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:11	0			4.88	1616	6.90	71.9	19.5	1440
11:14	1.0L			4.29	1521	7.06	67.8	18.9	1341
11:17	2.0L			4.45	1414	7.12	68.8	18.9	1246
11:20	3.0L			4.50	1380	7.13	72.2	18.8	1217
11:23	4.0L			4.38	1386	7.15	74.3	18.7	1221
11:26	5.0L			4.33	1381	7.13	75.7	18.7	1218
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:			<input checked="" type="checkbox"/> x 40 mL Vial (HCl) <input checked="" type="checkbox"/> x 40 mL Vial (1% SO ₄)		<input checked="" type="checkbox"/> x 60 mL Ferrous <input checked="" type="checkbox"/> x 100 mL Amber <input checked="" type="checkbox"/> x 60 mL metals (HNO ₃) <input checked="" type="checkbox"/> x 250 mL Plastic		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
					N/A				
Approval and Distribution									
[Signature] Fieldwork Staff Signature		7/9/17 Date		_____ Checker Name and Signature			_____ Date		
_____ Project Manager Signature		_____ Date		Distribution: Project Central File					

ANZ

FGM - Groundwater Sampling and Purging Record

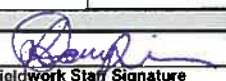
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Baoliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D4					
						Sample Date: 7/9/17					
General Bore Information				Parameter Info		Decontamination					
Date of GW Level: 7/9/17		Bore Radius (mm):		Chem. Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc): 0.15		Screen Interval (m):		Chem. Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated					
Bore Depth (m-pvc): 3.91		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (grip/slick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: FI Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra					
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC ₅ (mMolm ⁻³ or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
10:41	0			3.20	214.0	6.15	65.8	18.5	187.0	Turbid, nil odour.	
10:44	1.0L			1.82	211.3	6.12	114.4	18.4	184.7		
10:47	2.0L			1.74	212.8	6.11	130.3	18.4	185.3		
10:50	3.0L			1.98	215.3	6.11	142.5	18.3	188.0		
10:53	4.0L			2.02	216.3	6.11	151.3	18.4	188.9		
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered: Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		n/A			
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amper		x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		7/9/17		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

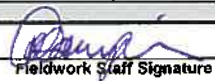
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Bealier Wetlands		Fieldwork Staff:		Bore / Location ID: T4C			
						Sample Date: 7/9/17			
						Well Development or Well Sampling Event? (circle)			
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Low Flow: Pump rate:			
Depth to GW (m-pvc): 5.365		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Intake depth:			
Bore Depth (m-pvc): 10.83		Casing Radius (mm):		Corrected Redox: Y N		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Depth to Product (m-pvc)		Cover Type (gatic/stick Up)		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Product Thickness (m)		Bore Locked (YES/NO)		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
		Key Type (if applicable):				Hydrasleeve Size:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve Type:			
						Monitoring sequence followed (number in order):			
						Sampling Depth (m-pvc):			
						Hydrasleeve Install time:			
						Sampling Start Time:			
						Parameters			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SVL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:15	0			3.71	505	5.97	30.0	20.1	458.1 Slightly cloudy, nil odour
10:18	1.0L			0.85	505	5.94	-0.4	19.9	455.0
10:21	2.0L			0.46	506	5.91	-7.5	19.9	456.7
10:24	3.0L			0.40	506	5.90	-8.7	19.9	456.2
10:27				0.37	506	5.90	-9.4	19.9	456.9
Acceptable Parameter Range:									
				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 7/9/17		Checker Name and Signature: _____			Date: _____		
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: T43					
						Sample Date: 7/9/17					
						Well Development or Well Sampling Event? (circle)					
General Bore Information			Parameter Info.		Decontamination		Sampling Method			Hydrasleeve Info.	
Date of GW Level: 7/9/17			Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 10.56			Chem Kit Model: YSI Pro BSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 2.19			Corrected Redox: Y / <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):			Cover Type (gatic/s tick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):			Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
			Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
09:46		0		3.99	503	4.91	154.8	19.0	439	Strong sulphur odour, very cloudy	
09:49		1.0L		0.73	447.0	5.22	8.2	17.9	386.2		
09:52		2.0L		0.28	445.6	5.23	-29.9	17.9	385.5		
09:55		3.0L		0.18	445.7	5.24	-48.9	18.0	385.6		
09:58		4.0L		0.17	445.6	5.24	-57.3	18.0	385.6		
10:01		5.0L		0.16	446.3	5.24	-60.8	18.0	386.4		
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Via ¹ (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		N/A	
				x 40 mL Via ¹ (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
Approval and Distribution											
Fieldwork Staff Signature: 			Date:		Checker Name and Signature:			Date:		Distribution: Project Central File	
Project Manager Signature:			Date:								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Man Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH10		Sample Date: 7/9/17		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 1.335	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 5.59	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging:			
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Walerra	Hydrasleeve Install time:	Hydrasleeve in:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out:				
	Key Type (if applicable):					Parameters:				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
09:13	0			1.60	279.4	5.15	158.1	18.1	282.1	Thin stained, sulphur odour.
09:16	1.0L			0.36	235.6	4.90	174.8	18.1	204.7	
09:19	2.0L			0.21	235.0	4.87	175.3	18.2	204.6	
09:22	3.0L			0.17	238.3	4.90	167.7	18.3	207.9	
09:25	4.0L			0.16	240.1	4.91	162.5	18.4	210.1	
09:28	5.0L			0.15	243.5	4.91	160.8	18.4	213.5	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrus	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 7/9/17		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D3							
						Sample Date: 7/9/17							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 3.615		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 7.12		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP (mg/L or µM/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
08:37	0			3.90	327.4	5.69	165.3	18.8	288.8	C Mostly clear nil odour			
08:40	0.7 L			3.07	314.2	5.72	161.0	19.2	279.3				
08:43	1.5 L			4.06	286.7	5.92	159.9	19.3	255.5				
08:46	2.1 L			3.33	306.3	5.78	152.6	19.3	273.3				
08:49	2.8 L			3.20	314.6	5.76	147.5	19.4	281.0				
8:52	3.3 L			3.35	309.3	5.81	145.2	19.4	276.8				
8:55	4.0 L			3.33	311.9	5.80	144.5	19.4	279.4				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered: Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ CO ₃)		x 100 mL Amber		x 250 mL Plastic							
Approval and Distribution													
Fieldwork Staff Signature: <i>[Signature]</i>			Date: 7/9/17			Checker Name and Signature: _____			Date: _____				
Project Manager Signature: _____			Date: _____			Distribution: Project Central File							

ANZ

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 6		Project Number: 60478410		PM Name: Chris McGraghan		<input type="checkbox"/> Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: BL Jetty Sample Date: 8/9/17					
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP etc. (redox or µS/cm)	pH	Redox (mV)	Temp °C	C Odeur, Colour, Turbidity		
	15cm			4.15	1204	7.63	110	20.1	C	N/TU	1093 3.3
	50cm			3.95	1202	7.59	113.6	20.0			1088 5.0
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beel'ar Wetlands		Fieldwork Staff:		Bore / Location ID: A2						
						Sample Date: 8/9/17						
						Well Development or Well Sampling Event? (circle)						
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC ETC. (to 8/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	15cm			5.21	1202	7.73	111	21.0	C	NTU	1113	15.5
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)												
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 80 mL metals (HNO ₃)	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
Approval and Distribution												
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 8/9/17		Checker Name and Signature: _____				Date: _____				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File								

ANZ

FGM - Groundwater Sampling and Purging Record

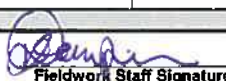
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60476410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BLNS-B1		Sample Date: 8/9/17					
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI-Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y10		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):										Sampling Start Time:		Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):					
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC ^{EG} (mMoles or μS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity				
	15cm			3.21	1210	7.42	90.8	20.3	1103	3.8			
	100cm			2.59	1210	7.38	72	19.5	1086	4.3			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered: Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc					
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic							
Approval and Distribution													
Fieldwork Staff Signature		8/9/17		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File									

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Man Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A25			
						Sample Date: 8/9/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination:		Sampling Method			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)		Sampling Start Time:		
	Key Type (if applicable):		<input type="checkbox"/> Retrieved				Hydrasleeve out Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SpE Ec: (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			4.13	1215	7.44	77	20.7	C NTA 1115 8
						7.51			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	NTA		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 8/9/17		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff:		Bore / Location ID: RD1A						
						Sample Date: 8/9/17						
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve install time:		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	15cm			0.29	729	6.62	53	16.6	C	NTU	400	Lots of organic matter in water
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff:		Bore / Location ID: RD1			
						Sample Date: 8/9/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterma			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC: (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			0.25	752	6.71	16.0	16.3	C NTU 628 26.5
									Too much debris for deeper reading.
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HC)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A.		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 8/9/17		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: F32			
						Sample Date: 8/9/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information			Parameter Info.		Decontamination		Sampling Method		
Date of GW Level:			Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		
Depth to GW (m-pvc):			Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		
Bore Depth (m-pvc):			Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		
Depth to Product (m-pvc):			(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		
Product Thickness (m):			Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve (postfall) time:		
Bore Locked (YES/NO):			<input checked="" type="checkbox"/> Retrieved				Sampling Start Time:		
Cover Type (gatic/st.cx up):							Monitoring sequence followed (number in order):		
Key Type (if applicable):							Gauging		
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Spec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			0.92	772	6.57	-6.4	17.4	C 655 NTU 5.8
	40cm			0.40	772	6.48	-88	15.9	638 246
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	F54A		
Sample Date:			


Project Name:	Building Roe B	Project Number:	60478410	PM Name:	Chris McGreghan
Client:	Main Roads	Project Location:	Beellar Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	Screen Interval (m.):	Chem Kit Model:	YSI ProDSS	<input checked="" type="checkbox"/> Dedicated	Inlake depth:	Hydrasleeve Type:	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out:
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved				Parameters
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):			

Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			2.02	773	6.64	-65.1	18.2	670	1400	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A	Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	<u>2/9/17</u>		
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		<input checked="" type="checkbox"/> Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: South 51 Sample Date: 8/9/17					
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gathers/lift up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m)	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC: (mM/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	15cm			0.42	346	6.37	-51	14.4	275	700	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

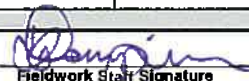
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: A3				
						Sample Date: 8/9/17				
						Well Development or Well Sampling Event? (circle)				
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Hydrasleeve info.										
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stck up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Logged (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Other (specify):	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP Conc. (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			0.51	18 370	6.01	-74	13.0	C	NTU 180
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrads	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork/Staff Signature: 		Date: 8/9/17	Checker Name and Signature: _____			Date: _____				
Project Manager Signature: _____		Date: _____	Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: A1					
						Sample Date: 8/9/17					
						Well Development or Well Sampling Event? (circle)					
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Hydrasleeve info.											
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in					
Product Thickness (m)	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	59C EC. (µM/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.40	1609	7.21	-187	17.1	1365	49	
	40cm			0.25	1653	7.07	-210	16.7	1389	330	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 8/9/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>					
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: NLWS-N2					
						Sample Date: 8/9/17					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Low Flow: Pump rate:					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Decontaminated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Dedicated					
Depth to Product (m-pvc):		Cover Type (rod/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other: (specify)		<input checked="" type="checkbox"/> Disposable					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer					
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump					
						<input checked="" type="checkbox"/> Waterra					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve Size:					
						Hydrasleeve Type:					
						Sampling Depth (m-pvc):					
						Hydrasleeve Install time:					
						Sampling Start Time:					
						Monitoring sequence followed (number in order):					
						Gauging					
						Hydrasleeve in					
						Hydrasleeve out					
						Parameters					
Total purged volume (L):											
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPES (mM or μSiem)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.18	1602	7.29	-190	17.0	1371	29.8	
	40cm			0.13	1830	7.12	-217	16.1	1516	60	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 103 mL Amber	x 250 mL Plastic			N/A				
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

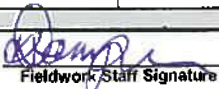
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: A10 Sample Date: 8/9/17							
General Bore Information		Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)							
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated <input type="checkbox"/> Low Flow: Pump rate:							
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated Intake depth:							
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable <input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Walerra Hydrasleeve install time:							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify): Sampling Start Time:							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		Hydrasleeve out: Parameters							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ERC E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
	15cm			0.24	1213	6.74	-170	19.5	C NTU 51				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HND)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic									
Approval and Distribution													
Fieldwork Staff Signature		8/9/17		Checker Name and Signature				Date					
Project Manager Signature		Date		Distribution: Project Central File									

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A1E				
						Sample Date: 8/9/17				
						Well Development or Well Sampling Event? (circle)				
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Data of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):						Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			0.15	1198	6.87	-199.5	17.4	C	NTU 33.7
	40cm			0.12	1242	5.98	-165	16.2		5.2
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ O ₂)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 8/9/17		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: Groundwater:

Bore / Location ID: D2

Sample Date: 13/9/17

Project Name: Building Roe B Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beoliar Wetlands Fieldwork Staff: Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level: <u>13/9/17</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <u>1.67</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): <u>5.57</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (<u>gatic</u> stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved			Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
4:04	0			1.54	688	6.05	161	18.4	C 604	
4:07	1.0L			0.47	722	6.05	158.3	18.4	631	
4:10	2.0L			0.34	718	6.06	155	18.4	626	
4:13	3.0L			0.30	688	6.08	154	18.5	602	
				0.27	691	6.08	152	18.4	605	

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				

Approval and Distribution:

Fieldwork Staff Signature: [Signature] Date: 13/9/17

Checker Name and Signature: _____ Date: _____

Project Manager Signature: _____ Date: _____ Distribution: Project Central File

Kim Munday farm manager
 0414 362 473.

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Rco 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: D1			
						Sample Date: 13/9/17			
General Bore Information				Parameter Info.		Decontamination			
Data of GW Level: 13/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.49		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 6.55		Casing Rad us (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stock up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRFA (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
4:26	0			2.20	525	6.16	137	18.6	460 Strong sulphur odour
4:29	1.0L			0.36	516	5.68	168	19.1	456 Slightly cloudy
4:32	2.0L			0.28	509	5.67	172	19.1	451
4:35	3.0L			0.20	509	5.66	175	19.1	451
4:38	4.0L			0.19	493	5.62	178	19.1	440
4:41				0.18	490	5.63	176	19.1	434
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metal (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Aragon	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 13/9/17		Checker Name and Signature: _____			Date: _____		
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A25 Sample Date: 19/9/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gat.c/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:						Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	30cm			5.17	1242	7.65	96.9	22	C	NTU	9.4
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PN Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Seelair Wetlands		Fieldwork Staff:		Bore / Location ID: BL05-B1					
						Sample Date: 19/9/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):			<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SVA (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC EPC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	30cm			5.08	1243	7.64	99.3	22.1	1173	4.8	
	100cm			3.87	1249	7.45	-27.3	21.2	1161	74	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	2 x 40 mL Vial (HCl)	2 x 60 mL Ferrous	4 x 60 mL metals (HNO ₃)	2 x extra Amber	Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		2 x 40 mL Vial (H ₂ SO ₄)	4 x 100 mL Amber	2 x 250 mL Plastic	WQA 02						
		2 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

					Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Bore / Location ID: <u>R01</u>		
Client: Main Roads				Project Location: Beelair Wetlands		Fieldwork Staff:		Sample Date: <u>19/9/17</u>		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):								Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mBqem or µBqem)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	<u>30cm</u>			<u>0.27</u>	<u>682</u>	<u>6.98</u>	<u>-136</u>	<u>16.8</u>	<u>C</u>	<u>NTU</u> <u>630</u>
										<u>Too polluted to get a deeper reading</u>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
		1 Chlorophyll								
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>19/9/17</u>		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 6D47B410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Booliar Wetlands		Fieldwork Staff:		Bore / Location ID: KD1A		Sample Date: 19/9/17		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro BSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve cut		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC E-6 (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity	
	5cm			0.25	706	6.58	-34.5	16.6	C	N/A 370
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments	
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HC)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
		1 (Chlorophyll)								
Approval and Distribution										
Fieldwork Staff Signature:		Date: 19/9/17		Checker Name and Signature:			Date:			
Project Manager Signature:		Date:		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

White stake

Surface Water: Groundwater:

Bore / Location ID: *F52*

Sample Date: *19/9/17*

Project Name:	Building Roe B	Project Number:	60478410	PM Name:	Chris McGraghan	Well Development or Well Sampling Event? (circle)					
Client:	Main Roads	Project Location:	Beeliar Wetlands	Fieldwork Staff:							
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / <i>N</i>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if appl cable):		<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5P.C.C. (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	<i>15cm</i>			<i>0.59</i>	<i>799</i>	<i>6.62</i>	<i>-21.4</i>	<i>17.7</i>	<i>690</i>	<i>8.7</i>	
	<i>40cm</i>			<i>0.16</i>	<i>800</i>	<i>6.60</i>	<i>-43</i>	<i>16.5</i>	<i>668</i>	<i>23</i>	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C		± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
<i>Chris McGraghan</i>		<i>19/9/17</i>		Checker Name and Signature				Date			
Fieldwork Staff Signature		Date		Distribution: Project Central File							
Project Manager Signature		Date									

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Baalier Wetlands		Fieldwork Staff:		Bore / Location ID: F54A		Sample Date: 19/9/17				
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters			
Key Type (if applicable):												
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP etc. (mV/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity			
	30cm			0.33	300	6.65	-29	18.1	691	1200		
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HND)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
			1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
			1 x 40 mL Vial (H ₂ O ₂)									
Approval and Distribution												
Fieldwork Staff Signature		Date: 19/9/17		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60476410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A2					
						Sample Date: 19/9/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):				Gauging
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			6.24	1242	7.72	83.7	21.9	C	NTU	7.6
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL me/als (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 19/9/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							


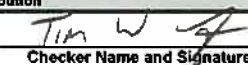
FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BL Jetty			
						Sample Date: 19/9/17			
General Bore Information			Parameter Info		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent):	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR-EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			5.36	1243	7.51	80.5	22.1	C NTU
	60cm			4.98	1243	7.57	81.3	21.7	2.1
									3.1
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 17/9/17		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: Bona BH12							
						Sample Date: 22/9/17							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level: 22/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 12.865		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 17.61		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
10:46	0			10 -	256.6	6.00	174.3	19 -	227.1 Cloudy, yellow taint.				
10:49	1			8.6	256.4	5.84	193.1	19.5	229.3				
10:52	2			8.49	254.9	5.82	201.7	19.5	228.1				
10:55	2.8			8.50	255 -	5.82	204.5	19.4	227.9 Milky				
10:58	3			8.50	254.7	5.81	206.9	19.4	227.8				
11:01	4			8.48	254.9	5.81	208	20.1	231				
11:04	4.5			8.49	254.3	5.81	209	20.2	231 - Cloudy, milky				
11:07	5.1			8.51	254.6	5.80	209.7	20.3	231.2				
11:10	6			8.55	254.2	5.80	211.4	19.9	229.2				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (H-NO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature: 			Date: 22/9/17			Checker Name and Signature: 			Date: 22/9/17				
Project Manager Signature: _____			Date: _____			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beeliear Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D8							
						Sample Date: 22/9/17							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level: 22/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 10.225		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 12.37		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity			
1:37	0			2.70	6.74	6.29	-57.3	20.2	613	Clear, slight sulfur smell			
1:40	0.3			1.27	6.90	6.24	-71.6	20.3	629				
1:43	1			1.00	6.72	6.20	-76.6	20.4	612				
1:46	1.4			0.80	7.10	6.22	-82.2	20.4	649				
1:49	1.8			0.54	7.13	6.22	-85.5	20.5	652				
1:52	2.4			0.45	7.15	6.22	-89.2	20.5	653				
1:55	3			0.39	7.24	6.22	-93.7	20.5	663				
1:58	3.5			0.39	7.21	6.23	-95.7	20.3	654				
2:01	4			0.39	7.25	6.23	-97.9	20.0	655				
2:04	4.5			0.38	7.32	6.23	-99.2	19.9	659				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Via. (HCl)		50 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Via. (H ₂ SO ₄)		100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature: <i>[Signature]</i>			Date: 22/9/17			Checker Name and Signature: <i>[Signature]</i>			Date: 22/9/17				
Project Manager Signature: _____			Date: _____			Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A3			
						Sample Date: 26/9/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Monitoring sequence followed (number in order):		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging		
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time: Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP (mg/L or µg/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			0.58	358	6.33	-52.1	12.2	C NTU 271.1 285
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
		1 Chlorophyll							
Approval and Distribution									
Fieldwork Staff Signature: <i>Daniel</i>		Date: 26/9/17		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
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Bore / Location ID:	South - S1
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Sample Date:	26/9/17
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Well Development or Well Sampling Event? (circle)

Project Name:	Building Roe 8	Project Number:	6047B410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:	
General Bore Information		Parameter Info.		Decontamination	Sampling Method
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101155	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra
Product Thickness (m):	Bore Locked (YES/NO)	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	Hydrasleeve Instal time:
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		Sampling Start Time:
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):		

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5/CUES (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
	15cm			0.94	350	7.81	-102	11.9	260.5	NTU 75

Acceptable Parameter Range: ± 10% DO, ± 3% CUES, ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp, ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:	Bottles Collected	QA/QC Information	Field Comments
Field Filtered: Unfiltered:	1 x 40 mL Vial (HCl) 1 x 40 mL Vial (H ₂ SO ₄) 1 x 100 mL Amber 2 x 60 mL Ferrous 1 x 60 mL metals (HNO ₃) 1 x 250 mL Plastic		Bore volume calculation, bore condition, fate of tubing, redox correction etc.

Approval and Distribution			
	26/9/17	<hr/>	<hr/>
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
<hr/>	<hr/>	Distribution: Project Central File	
Project Manager Signature	Date		

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: NL605-N2					
						Sample Date: 26/9/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (m.m):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Walerra	Hydrasleeve Instal time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):			<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC (mg/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.17	1299	7.42	-187	13.7	1019	29.6	
	80cm			0.13	1306	7.44	-217	13.7	1024	43.4	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 26/9/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: <u>A7</u>		Sample Date: <u>26/9/17</u>								
Project Name: Building Roc B	Project Number: 60478410	PM Name: Chris McGraghan								
Client: Main Roads	Project Location: Beefar Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (m.m):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			0.29	1282	7.33	-171	13.7	C	NTU
	50cm			0.22	1287	7.32	-182	13.3	1006	37
									1011	30
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
		1 Chloroform								
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>26/9/17</u>		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Surface Water: Groundwater:

Bore / Location ID: GW-05

Sample Date: 26-9-17

Project Name: Building Roe 8 Project Number: 60478410 PM Name: Chris McGrath
 Client: Main Roads Project Location: Beelair Wetlands Fieldwork Staff:

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): <u>2.22</u>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc): <u>5.96</u>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gat/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved				Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):					

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
11:57	0			2.80	816	5.67	70.2	17.3		
12:00	1.1			1.20	564	5.20	133.7	17.7		693. Tea colour
12:03	2.3			1.91	462.7	4.96	153.6	17.5		466.4
12:06	3.7			1.58	713	5.16	120.3	17.8		398.6
12:09	4.6			1.23	711	5.20	119.3	18		618
12:12	5.5			1.08	727	5.23	114.8	17.8		615
12:15	6.4			1.03	734	5.24	118.2	17.7		628
										634

Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp, ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				

Approval and Distribution

Fieldwork Staff Signature: [Signature] Date: 26/9/17
 Checker Name and Signature: Tim W [Signature] Date: 26/9/17
 Project Manager Signature: _____ Date: _____
 Distribution: Project Central File

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: Groundwater:

Bore / Location ID: 72F

Sample Date: 26/9/17

Project Name: Building Roe 8 Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beelair Wetlands Fieldwork Staff: Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): <u>2.185</u>	Screen Interval (m):	Chem Kit Mode:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	
Bore Depth (m-pvc): <u>4.16</u>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:	Hydrasleeve in:
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved				Sampling Start Time:	Hydrasleeve out:
	Key Type (if applicable):						Parameters

Calculated bore volume (L): Includes/ excludes bore annulus (circle) # purge volumes removed: Total purged volume (L):

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11:27	0			2.05	877	5.87	62.9	16.8	734.	Clear.
11:30	1.5			0.36	827	6.01	15.8	17.9	709.	
11:33	3			0.25	804	6.01	12.2	17.9	696.	
11:36	4.			0.20	803	6.01	9.6.	18-	697.	
11:39	5.			0.17.	804.	6.01	8.7.	18.1	698.	
11:42	6.			0.13	807	6.01	4.4.	18-	698.	
11:45	7.			0.12	808	6.01	5.3	18	700.	

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (-H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature: [Signature] Date: 26/9/17 Checker Name and Signature: Tim W [Signature] Date: 26/9/17

Project Manager Signature: _____ Date: _____ Distribution: Project Central File

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrathan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff:		Bore / Location ID: CW-TBE-A		Sample Date: 26/9/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.615		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 3.62		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterira		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out Parameters	
Key Type (if appl cable):											
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:59	0			2.13	827	5.50	75.4	18.2	725	Sulfur smell, organics visible.	
11:02	1.2			0.35	823	5.34	81.2	18.6	722		
11:05	2.8			0.26	829	5.29	81.5	18.7	728		
11:08	4.0			0.23	829	5.27	80.0	18.7	728		
11:11	4.6			0.21	825	5.27	78.6	18.7	726		
11:14	5.2			0.19	828	5.25	75.8	18.7	728		
11:17	6			0.18	830	5.25	73.4	18.7	729		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HND ₂)			Bore volume calculation, bore condition, state of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 26/9/17		Checker Name and Signature: <i>[Signature]</i>		Date: 26/9/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D3		Sample Date: 26/9/17			
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)	
Date of GW Level: 26/9/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 13.615		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 7.135		Casing Radius (m.m):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterma		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Instal. time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Retrieved				Sampling Start Time:	
Key Type (if applicable):										Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
10:14	0		~0.3L/min	3.44	342.3	6.05	35.9	18.7	302.8	Slightly turbid	
10:17	1			2.50	345.6	5.73	89.7	18.6	303.2		
10:20	2			2.49	346-	5.71	103.8	18.8	305.2		
10:23				Battery on Pump Dried							
10:26	2.5			2.35	343.8	5.70	117	18.9	303.2		
10:29	3			2.33	339.6	5.68	128.7	19.2	301.7		
10:32	3.5			2.77	332.6	5.73	129.2	19.1	294.1		
10:35	4.2			2.75	330.8	5.72	130.8	19.1	293.8		
10:38	5			2.52	332.7	5.70	131.9	19.1	295.8		
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
Approval and Distribution											
Fieldwork Staff Signature:		Date: 26/9/17		Checker Name and Signature:				Date: 26/9/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building R00 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T4L Sample Date: 27/9/17						
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 5.315		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Hydrasleeve Size:				
Bore Depth (m-pvc): 10.82		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		Intake depth:				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		Hydrasleeve Type:				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Depth (m-pvc):				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved				Hydrasleeve Install time:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Hydrasleeve In				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Set. (m8/cm or µ8/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
4.05	0			2.43	500	6.17	67.0	19.3	445.8			
4.08	1 L			0.36	501	5.95	36.7	19.6	456.8			
4.11	2 L			0.29	510	5.94	31.9	19.6	457.1			
4.14	3 L			0.23	509	5.93	30.5	19.6	456.3			
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HND ₂)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (I ₂ /SO ₂)		x 100 mL Amber		x 250 mL Plastic				
Approval and Distribution												
Fieldwork Staff Signature			Date			Checker Name and Signature			Date			
Project Manager Signature			Date			Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T4B T4B Sample Date: 27/9/17							
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decant/riparated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):						
Depth to GW (m-pvc): 0.49	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:							
Bore Depth (m-pvc): 2.012	Casing Radius (mm):	Corrected Redox: Y / N		<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time	Hydrasleeve out						
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved				Parameters						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mg/l or µS/cm)	pH	Redox (mV) OR	Temp °C	Odour, Colour, Turbidity				
1.03				1.56	453.6	5.42	35.5	18.1	389.0				
1.06				0.48	446.1	5.33	18.0	17.8	38 384.1				
1.09				0.26	443.7	5.31	6.8	17.7	382.7				
1.12				0.19	442.3	5.31	-0.9	18.0	383.0				
1.15				0.16	442.4	5.31	-9.3	17.9	383.0				
1.18	6.5			0.14	441.3	5.31	-16.0	18.0	382.7				
1.21				0.13	441.3	5.31	-22.4	17.9	381.6				
1.24				0.12	440.7	5.31	-28.6	17.8	38 380.1				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					Strong Sulfur Slightly turbid.				
Approval and Distribution													
Fieldwork Staff Signature:			Date: 27/9/17			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Wetlands Bridge

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	T3C		
Sample Date:	27/9/17		

Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beekar Wetlands	Fieldwork Staff:	

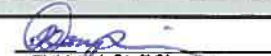
General Bore Information			Parameter Info.		Decontamination		Sampling Method			Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:				
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved				Hydrasleeve out Parameters				

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity	
3 4.15				1.48	478	5.37	119.4	17.1	400	
3 4.18				0.4	372.1	5.37	107.9	17.1	317.4	
3 4.4	2.5			0.30	372.0	5.38	108.0	17.2	316.2	
3 4.24				0.26	373.5	5.35	108.5	17.2	318.4	
3 4.27				0.25	376.7	5.35	109.1	17.2	320.7	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic			

Approval and Distribution			
	Date: 27/9/17	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roc 8			Project Number: 60478410			PM Name: Chris McGraghan			Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads			Project Location: Bealiba Wetlands			Fieldwork Staff:			Bore / Location ID: DL			
Sample Date: 27/9/17			Well Development or Well Sampling Event? (circle)									
General Bore Information			Parameter Info.			Decontamination			Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:			Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 2.30	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:			Hydrasleeve Type:					
Bore Depth (m-pvc): 6.55	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)			<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)			<input type="checkbox"/> Other (specify)			Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved										
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sp. Conc. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
9:29	0			1.62	527	5.90	137.6	18.4	C			
9:32				0.45	519	5.68	152.7	19.0	459.5			
9:35				0.28	512	5.65	159.1	18.9	452.6			
9:37				0.23	499.6	5.62	161.8	18.9	441.7			
9:39	6			0.22	495.0	5.62	163.7	19.0	435.5			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL meta/s (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. Slightly turbid. No odor				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic								
Approval and Distribution												
<i>Chris McGraghan</i> Fieldwork Staff Signature		27/9/17 Date		_____ Checker Name and Signature				_____ Date				
_____ Project Manager Signature		_____ Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 6047B41D		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D7					
						Sample Date: 27/9/17					
General Bore Information			Parameter Info		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.27	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 4.39	Casing Radius (mm):	Corrected Redox:	Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Baller <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)			<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):			<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV) ORP	Temp °C	Odour, Colour, Turbidity		
10:18				8.69	832	6.94	109.8	18.0	C		
10:21	1.3			8.50	994	7.25	97.3	18.2	766		
10:24				8.08	1070	7.31	92.5	18.1	865		
10:27	4.2			7.68	1187	7.30	91.7	18.2	734		
10:30				7.14	1294	7.29	90.5	18.3	1042		
10:33				6.76	1391	7.28	90.2	18.3	1130		
10:36	8			6.23	1456	7.28	90.5	18.2	1213		
									1269		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	2 x 40 mL Vial (HCl)	2 x 60 mL Ferrous	2 x 60 mL meta's (HND ₂)	2 x 250 mL P.astic	2x extra amber		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		2 x 40 mL Vial (H ₂ SO ₄)	4 x 100 mL Amber			WQA01		Slightly turbid			
Approval and Distribution											
Fieldwork Staff Signature:		Date: 27/9/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

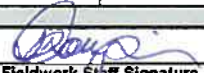
FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: <u>ERT 3 B</u>					
						Sample Date: <u>27/9/17</u>					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): <u>1.42</u>	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc): <u>3.23</u>	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gat.c/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10.54				1.67	210.4	6.75	-1.7	18.4	C		
10.57				0.41	191.4	6.10	42.2	18.3			
10.59	3			0.30	168.5	6.03	52.4	17.5			
11.02	5.5			0.24	186.5	5.97	60.8	19.5			
11.05				0.21	188.4	5.97	65.4	19.5			
11.07	6.5			0.19	184.6	5.95	68.7	19.6			
11.10				0.18	194.0	5.94	70.1	19.6			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution											
Fieldwork Staff Signature: <u>[Signature]</u>			Date: <u>27/9/17</u>			Checker Name and Signature: _____			Date: _____		
Project Manager Signature: _____			Date: _____			Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH10			
						Sample Date: 27/9/17			
General Bore Information				Parameter Info		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 1.23		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 5.62		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S EC. (address or µS/cm)	pH	Redox (mV or µV)	Temp °C	Odour, Colour, Turbidity
11.21				1.84	390.4	5.04	139.2	17.8	338.2
11.24	1.5			0.91	396.8	4.86	155.2	17.6	341.0
11.27				0.75	390.2	4.85	160.6	17.7	335.2
11.30	3.5			0.66	376.6	4.97	149.5	17.8	324.6
11.33				0.63	382.7	5.10	128.5	17.8	330.5
11.36				0.66	387.9	3.5.09	120.5	17.8	334.5
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. Dark, coffee coloured water		
		1 x 40 mL Vial (-1 ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 27/9/17		Checker Name and Signature: _____			Date: _____		
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	D2		
Sample Date:	27/9/17		

Project Name:	Building Roe B	Project Number:	6C478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beeliar Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	1.57	Screen Interval (m):		<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	5.57	Casing Radius (mm):		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	Corrected Redox: Y / N		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):					

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SAC. (mS/cm or µS/cm)	pH	Redox (mV) or	Temp °C	C	Odour, Colour, Turbidity
9.07	0			2.60	684	6.07	147.0	17.7	152/6	598
9.10				0.57	688	6.12	147.0	18.0		596
9.13				0.33	697	6.14	146.1	18.0		604
12.32				3.43	693	6.04	118.8	18.4		605
12.35				1.50	697	6.05	131.1	18.2		598
12.38				1.9	690	6.07	137.2	18.4		601
12.41	3.5			0.97	667	6.07	136.9	18.3		583
12.43				0.83	667	6.08	135.1	18.4		582
12.45	5			0.67	663	6.07	134.1	18.4		580
12.48				0.61	647	6.10	131.8	18.4		564

Acceptable Parameter Range: ± 10% DO, ± 3% SAC, ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp, ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. slightly turbid
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	27/9/17	Checker Name and Signature	Date
Fieldwork Staff Signature	Date		
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:						
Bore / Location ID: <i>GW-04</i>		Sample Date: <i>29/9/17</i>		Well Development or Well Sampling Event? (circle)						
Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156						
Depth to GW (m-pvc): <i>7</i>		Screen Interval (m):		Chem Kit Made: YSI Pro DSS						
Bore Depth (m-pvc): <i>3.9</i>		Casing Radius (mm):		Corrected Redox: Y / N						
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)						
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole						
Key Type (if applicable):				<input type="checkbox"/> Retrieved						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						
Total purged volume (L):										
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	PEC (mS/cm or μ S/cm)	pH	Redox (mV) <i>ORP</i>	Temp °C	Odour, Colour, Turbidity	
<i>3.41</i>				<i>3.04</i>	<i>259.3</i>	<i>6.11</i>	<i>114.6</i>	<i>18</i>	<i>224.6</i>	
<i>3.44</i>	<i>2.5</i>			<i>2.41</i>	<i>259.4</i>	<i>6.16</i>	<i>127.9</i>	<i>18</i>	<i>225</i>	
<i>3.47</i>				<i>2.61</i>	<i>258.3</i>	<i>6.15</i>	<i>137.7</i>	<i>18.2</i>	<i>225.4</i>	
<i>3.50</i>				<i>2.66</i>	<i>260.1</i>	<i>6.16</i>	<i>141.7</i>	<i>18.2</i>	<i>226.1</i>	
<i>3.53</i>				<i>2.64</i>	<i>258.7</i>	<i>6.17</i>	<i>143.6</i>	<i>18.3</i>	<i>225.1</i>	
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C
Analyses Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <i>[Signature]</i>		Date: <i>26/9/17</i>		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: FS2				
						Sample Date: 4/10/17				
General Bore Information			Parameter Info.		Decontamination	Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):	Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):	Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)			Sampling Start Time:		
		Key Type (if applicable):	<input type="checkbox"/> Retr.evod						Hydrasleeve cut Parameters	
Calculated bore volume (L):		includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity	
	30cm			1.08	718	6.63	28.2	13.8	564	3.6
	60cm			0.84	718	6.61	25.5	13.7	564	20.0
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A7E Sample Date: 4/10/17			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Hydrasleeve in/out Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	30cm			0.34	1094	7.20	-57.8	13.8	C 861 NTU 37.9
	60cm			0.23	1090	7.14	-67.5	13.9	860 107.3
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date	Checker Name and Signature			Date			
Project Manager Signature		Date	Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Rue 8		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Bealbar Wetlands		Fieldwork Staff:						
Surface Water: <input checked="" type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: <i>PS12 GW-D6</i>						
Sample Date: <i>2/10/17</i>		Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <i>10.19</i>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: <i>11m</i>	Hydrasleeve Typo:				
Bore Depth (m-pvc): <i>12.57</i>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP-54 (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:58	0			4.01	797	6.18	-21.4	20.4	731 Sulphur odour, slightly turbid	
15:02	1.0L			0.56	909	6.16	-50.9	20.1	824	
15:06	2.1L			0.43	884	6.16	-58.1	20.0	800	
15:10	3.1L			0.39	854	6.16	-63.9	20.0	772	
15:14	4.1L			0.38	852	6.16	-65.7	20.0	770	
15:18				0.37	850	6.16	-67.7	20.0	768	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date	Checker Name and Signature		Date					
Project Manager Signature		Date	Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BH 10		Sample Date: 4/10/17		
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Hydrasleeve info.
Date of GW Level: 4/10/17		Bore Radius (mm):	Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 8		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 12.82m		Screen Interval (m):	Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated	Intake depth: 17m		Hydrasleeve Type:		
Bore Depth (m-pvc): 17.69m		Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in:	
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time	Hydrasleeve out:	
		Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
14:12	0			10.26	236.6	5.78	168.7	21.9	224.8 Cloudy yellow	
14:17	1.1L			8.54	242.7	5.51	199.3	21.0	223.7	
14:21	2.1L			8.46	239.8	5.51	204.4	21.2	222.2	
14:25	3.1L			8.43	238.6	5.52	207.5	21.1	221.1	
14:29	4.1L			8.48	237.9	5.52	210.2	20.9	219.5	
14:33				8.47	237.6	5.52	211.6	21.1	219.7	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	N/A			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 4/10/17		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PW Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff:		Bore / Location ID: GWT3EA				
						Sample Date: 5/10/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 2.62m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 3.6m		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
8:36				0.69	1013	5.09	47.3	18.5	890	Clear, slight sulphur odour
8:37	1.7L			0.29	1014	5.00	46.2	18.7	897	
8:41	3L			0.20	1025	4.97	38.4	18.7	902	
8:44	4L			0.17	1031	4.96	36.4	18.7	908	
8:47	5L			0.14	1030	4.95	33.1	18.8	907	
8:50	6L			0.12	1029	4.96	30.1	18.7	906	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HND)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe B		Project Number: BD478410		PM Name: Chr's McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T35			
Date of GW Level: 5/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 5/10/17			
Depth to GW (m-pvc): 0		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)			
Bore Depth (m-pvc): 5.08		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		Decontamination			
Depth to Product (m-pvc):		Cover Type (gatic/click Up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		Sampling Method			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		Hydrasleeve info.			
Key Type (if applicable):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Monitoring sequence followed (number in order):			
Calculated bore volume (L):		Total purged volume (L):							
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Fe -26 (microM or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
09:53	0			2.64	386.9	5.81	75.5	16.8	326.8 Clear
09:56				1.44	392	5.35	80.5	17.1	335
09:59	1.8L			0.44	350.2	5.32	81.9	17.0	296.9
10:01	3L			0.31	355.5	5.31	82.4	17.1	301.7
10:03	4L			0.23	363.5	5.31	81.9	17.1	308.2
10:06	5L			0.17	374.2	5.30	80.8	17.1	318.0
10:09	6L			0.16	380	5.30	71.7	17.2	323.3
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrypods	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 5/10/17		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6D478410		PM Name: Chris McGrath		Sample Date: 4/10/17		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A 2						
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101158		<input type="checkbox"/> Decontaminated <input checked="" type="checkbox"/> Dedicated <input type="checkbox"/> Disposable <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Low Flow: Pump rate: <input type="checkbox"/> Intake depth: <input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra <input type="checkbox"/> Other (specify)		Hydrasleeve Size: Hydrasleeve Type: Sampling Depth (m-pvc): Hydrasleeve Install time: Sampling Start Time: Monitoring sequence followed (number in order): Gauging Hydrasleeve in Hydrasleeve out Parameters		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS								
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N								
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)								
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole								
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTP	Odour, Colour, Turbidity	
30cm	8.13			0.42	1204	7.25	84.5	14.8	970		20.7	
45cm	8.15			0.20	1178	7.30	-108.2	14.9	950		9.9% 25.4	
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		
Analytes Sampled for:		Bottles Collected		QA/QC Information		Field Comments						
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
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BLNSB1

14/10/17

Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Sample Date:
Client: Main Roads	Project Location: Boellar Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated			Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable):		<input type="checkbox"/> Retrieved					Parameters	

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters

20cm 7.59
50cm 8.00

Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μS/cm)	pH	Redox (mV)	Temp °C	C	MTU	Odour, Colour, Turbidity
20cm 7.59				7.6	1160	7.84	81.7	16.2	965	5.8	
50cm 8.00				7.05	1160	7.85	80.9	16.2	965	4.7	

Acceptable Parameter Range: ±10% DO, ±3% E.C., ±0.05 pH, ±10 mV Redox, ±0.2 °C Temp, ±10% turbidity (if using a turbidity meter)

Analytes Sampled for: Bottles Collected QA/QC Information Field Comments

Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	QA/QC Information	Field Comments
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Bore volume calculation, bore condition, fate of tubing, redox correction etc.

Approval and Distribution

Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: R01A		Sample Date: 4/10/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Watera		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Down-hole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/>		Sampling Start Time:	
Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/>		<input type="checkbox"/>		<input type="checkbox"/>		Hydrasleeve in	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		<input type="checkbox"/>		Hydrasleeve out	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Colour, Colour, Turbidity
				0.33	768	6.60	-5.4	14.3	611	13.5	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:				Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature			Date			Checker Name and Signature			Date		
Project Manager Signature			Date			Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Beelihar Wetlands		Sample Date: 4/10/17						
Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: 1-56A						
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (ms/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odeur, Colour, Turbidity	
				1054	723	6.7	203	13.2	560	17.4 NTD
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beejar Wetlands		Fieldwork Staff:		Bore / Location ID: A 1N		Sample Date: 4/10/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
8.25				1.6	1103	7.32	-62.1	13.6	862	54.7	
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic			
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

<input type="checkbox"/> Surface Water:		<input checked="" type="checkbox"/> Groundwater:									
Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan							
Client: Main Roads		Project Location: Beelihar Wetlands		Sample Date: 4/10/17							
<input type="checkbox"/> Bore / Location ID: A2		Fieldwork Staff:		Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.		Decontamination							
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:							
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Baller	<input type="checkbox"/> Hydrasleeve						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)							
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV) ^{ORP}	Temp °C	Odour, Colour, Turbidity		
7.48				7.64	155	7.8	86.8	16.4	C	NTU 5.0	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>NLWS 2</u>					
						Sample Date: <u>4/10/17</u>					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)			<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
<u>20cm</u> <u>50cm</u>	<u>8.18</u>			<u>0.21</u>	<u>1199</u>	<u>7.39</u>	<u>-108.5</u>	<u>14.9</u>	<u>C</u>	<u>NTU</u>	
				<u>0.17</u>	<u>1199</u>	<u>7.37</u>	<u>-115.5</u>	<u>14.9</u>	<u>968</u>	<u>21.7</u>	
									<u>969</u>	<u>24.4</u>	
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution											
Fieldwork Staff Signature			Date			Checker Name and Signature			Date		
Project Manager Signature			Date			Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Boolar Wetlands		Fieldwork Staff:		Bore / Location ID: BL Jetty Sample Date: 4/10/2017							
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc)	Screen Interval (m):	Chem Kit Model: YSI Pro QSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gate/stock up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Parameters					
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC/EC _c (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
	30m			7.05	151	7.64	97.1	16.4	C N/A 961 2.7				
	50m			7.11	151	7.77	90.4	16.4	962 2.9				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution													
Fieldwork Staff Signature			Date			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	GW05		
Sample Date:	5/10/17		

Project Name:	Building Roe B	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelias Wetlands	Fieldwork Staff:	

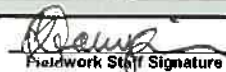
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	5/10/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	2.21	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	5.95	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):		Cover Type (circle/attach up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
		Key Typo (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters	

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP-EC (microhm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
09:30				1.22	855	5.68	42.5	17.5	733 Sulphur odour, weak tea colour
09:33	1L			0.31	890	5.48	35.7	17.6	765
09:36	2.2L			0.17	894	5.46	30.8	17.6	767
09:39	3.4L			0.14	899	5.46	29.3	17.6	772
09:42	4.5L			0.13	898	5.47	27.8	17.6	772

Acceptable Parameter Range:	±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	5/10/17	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: T2P				
						Sample Date: 5/10/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 2.17		Screen Interval (m):		Chem Kit Make: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 4.15		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
9.03				2.50	783	6.11	27.4	16.6	660	
9.06				0.40	770	5.96	-10.4	17.7	662	
9.09				0.22	758	5.96	-17.2	17.8	654	
9.12	3L			0.17	768	5.96	-19.7	18.0	665	
9.15				0.14	750	5.96	-22.9	18.0	673	
9.18				0.12	786	5.97	-24.9	17.9	680	
9.21				0.11	791	5.97	-26.8	18.0	685	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature			Date		Checker Name and Signature			Date		
Project Manager Signature			Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
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Bore / Location ID:	GW-DB
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Sample Date:	5/10/17
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Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Boolar Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	5/10/17	Bore Radius (mm):		Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	3.255	Screen Interval (m):		Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	
Bore Depth (m-pvc):	4.30	Casing Radius (mm):		Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	<input type="checkbox"/> Other (specify)	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method:	<input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
		Key Type (if applicable):							Parameters

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC EC (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
08:00	0			7.61	890	6.85	113.3	17.2	764	Turbid, nil odour.
8:03	1.5L			6.94	902	7.22	96.4	18.0	782	
8:06	2.6L			6.54	939	7.26	91.8	18.0	815	
8:09	3.7L			6.31	987	7.28	89.0	18.0	822	
8:12				6.19	949	7.29	87.3	18.2	825	
8:15				6.10	937	7.29	86.0	18.1	813	
8:18	7.0L			6.02	939	7.29	86.0	18.1	816	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrous	x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: 73B				
						Sample Date: 5/10/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 1.54		Screen Interval (m):		Chem Kit Mode: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 8.84		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:25	0			2.54	205	6.39	60.5	18.7	180	Slightly cloudy
10:28	1.5L			0.47	202.8	6.07	46.3	19.4	180.9	
10:31	2.5L			0.28	186.5	5.94	39.5	19.7	167.7	
10:34	3.5L			0.22	183.3	5.89	42.5	19.8	164.9	
10:37	4.8L			0.19	181.9	5.87	44.0	19.9	164.0	
10:40	6L			0.15	182.1	5.85	44.9	19.7	163.7	
10:43	7L			0.17	180.8	5.85	44.6	19.8	163.0	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
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Bore / Location ID:	BH10
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Sample Date:	5/10/17
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Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101158	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	1.33	Screen Interval (m):		<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	5.63	Casing Radius (mm):		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters	

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10.50			1.70 →	18.6	399.2	4.72	137.1	18.6	350.0	
10.53			2.1	0.42	403.3	4.55	151.6	18.5	352.9	
10.56	2.5			0.26	401.6	4.56	154.6	18.5	351.7	
10.59	4			0.18	392.2	4.65	153.9	18.5	342.1	
11.02				0.17	382.9	4.74	145.0	18.4	334.3	
11.05				0.19	383.7	4.74	141.6	18.4	335.4	
11.08				0.21	386.2	4.69	139.2	18.4	337.2	
11.11				0.22	387.0	4.68	138.5	18.4	338.0	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc Very turbid
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelbar Wetlands		Fieldwork Staff:		Bore / Location ID: G4-D4		Sample Date: 5/10/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 5/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101155		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 0.45m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 3.91m		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: FI Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		KV Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity		
11:20	0			5.02	289	5.70	117	18.2	C 235.7		
11:23	1.1L			2.98	266.9	5.97	118.5	18.4	233.3		
11:26	2.5L			2.97	266.8	6.01	126.8	18.4	233.4		
11:29	4.0L			2.70	266.9	6.04	129.4	18.4	232.8		
11:32	5.0L			3.09	262.7	6.04	132.4	18.4	229.3		
11:35	6.0L		3.06		262.8	6.04	135.4	18.4	230.9		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 5/10/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: CW-D3		Sample Date:									
Project Name: Building Roe B	Project Number: 6D47B410	PM Name: Chris McGraghan									
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff:									
General Bore Information			Well Development or Well Sampling Event? (circle)								
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated								
Depth to GW (m-pvc): 3.62	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated								
Bore Depth (m-pvc): 5.24	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable								
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra								
	Key Type (if applicable):	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
12:07				1.35	355.7	5.59	123.4	20.6	326		
13:10				0.93	351.4	5.41	133.1	19.8	316.5		
13:13	2L			1.45	346.5	5.48	126.2	19.8	311.8		
13:16	3L			2.62	328.3	5.65	110.4	19.7	295.0		
13:19	4L			2.61	330.2	5.66	107.2	19.7	297.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. Clear Odorless				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature _____				Date _____		Checker Name and Signature _____				Date _____	
Project Manager Signature _____				Date _____		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: Groundwater:

Bore / Location ID: 1D1

Sample Date: 5/10/17

Project Name: Building Roo 8 Project Number: 60478410 PM Name: Chris McGrathnan
 Client: Main Roads Project Location: Beelar Wetlands Fieldwork Staff: Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>2.37</u>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): <u>6.35</u>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Parameters	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):					

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeour, Colour, Turbidity	
<u>12:55</u>	<u>0</u>			<u>2.14</u>	<u>503</u>	<u>5.93</u>	<u>114</u>	<u>19.3</u>	<u>448.6</u>	
<u>14:58</u>	<u>1L</u>			<u>0.33</u>	<u>497</u>	<u>5.62</u>	<u>137.7</u>	<u>19.4</u>	<u>444.1</u>	
<u>15:00</u>	<u>2L</u>			<u>0.21</u>	<u>487.2</u>	<u>5.59</u>	<u>144</u>	<u>19.4</u>	<u>434.8</u>	
<u>15:04</u>	<u>3L</u>			<u>0.17</u>	<u>488.5</u>	<u>5.60</u>	<u>147.4</u>	<u>19.4</u>	<u>435.8</u>	
<u>15:07</u>	<u>4L</u>			<u>0.15</u>	<u>475.4</u>	<u>5.57</u>	<u>150.6</u>	<u>19.4</u>	<u>424.5</u>	
<u>15:10</u>	<u>5L</u>			<u>0.13</u>	<u>474.3</u>	<u>5.56</u>	<u>148.8</u>	<u>19.4</u>	<u>423.4</u>	

Acceptable Parameter Range: ±10% DO, ±3% E.C., ±0.05 pH, ±10 mV Redox, ±0.2 °C Temp, ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				

Approval and Distribution

Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>D2</u>			
						Sample Date: <u>5/10/17</u>			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): <u>1.58</u>		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): <u>5.56</u>		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2.26				4.22	687	6.03	59.4	19.1	606
2.29	1.56			1.70	671	6.1	90.8	18.5	587
2.32				1.58	668	6.11	102.7	18.5	585
2.35	4L			1.40	656	6.12	108.7	18.5	574
2.38				1.22	655	6.17	110.6	18.4	573
2.41				1.19	662	6.12	111.9	18.5	580
2.43				1.17	657	6.12	112.1	18.4	575
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathian		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: 746				
						Sample Date: 5/10/17				
General Bore Information				Parameter Info		Decontamination				
Date of GW Level: 5/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated <input checked="" type="checkbox"/> Dedicated <input checked="" type="checkbox"/> Disposable <input type="checkbox"/> Other (specify)				
Depth to GW (m-pvc): 5.51		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Low Flow: Pump rate: <input type="checkbox"/> Intake depth:				
Bore Depth (m-pvc): 10.82		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve <input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra <input type="checkbox"/> Other (specify)				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Hydrasleeve Size: <input type="checkbox"/> Hydrasleeve Type: <input type="checkbox"/> Sampling Depth (m-pvc): <input type="checkbox"/> Hydrasleeve Instal time: <input type="checkbox"/> Sampling Start Time:				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Monitoring sequence followed (number in order): <input type="checkbox"/> Gauging <input type="checkbox"/> Hydrasleeve in <input type="checkbox"/> Hydrasleeve out Parameters				
Key Type (if applicable):										
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
13:52				5.4	502	5.74	3.9	20.9	461.2	Mostly clear
13:55	1.5L			0.35	512	5.89	-5.1	20.0	463	
13:58	2.4L			0.22	514	5.89	-3.1	20.0	464.5	
14:01	3.5L			0.18	513	5.89	-0.7	20.0	463.8	
14:04	4.5L			0.15	512	5.90	0.8	20.0	463.0	
14:07	5.5L			0.14	512	5.90	1.4	20.0	462.7	
14:10	6.5L			0.13	511	5.90	1.7	20.0	462.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Val (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Val (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 5/10/17		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

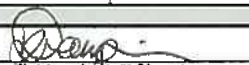
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrathen		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A2					
						Sample Date: 18/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
15:08	15cm			8.95	1175	7.99	85.2	20.9	C	NTU	6.5
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature:		Date: 18/10/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BKWS-B1					
						Sample Date: 18/10/17					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Mode: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra					
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			7.31	1178	7.79	94.1	20.3	1074	C NTC 2.9	
	50cm			6.93	1179	7.72	96.2	20.2	1071	3.6	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 Chlorophyll									
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 18/10/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: A25					
						Sample Date: 18/10/17					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve					
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra					
						<input type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SVA (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			7.18	1179	7.81	93.7	20.2	1071	3.5	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Rce 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: B6 Setty		Sample Date: 18/10/17				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:		
Key Type (if applicable):				<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity			
14:58	15cm			7.55	1176	7.61	92.3	20.4	1072	3.3		
15:07	40cm			7.49	1176	7.73	89.4	20.2	1069	4.4		
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 80 mL metals (+NO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic				
Approval and Distribution												
Fieldwork Staff Signature			Date: 18/10/17			Checker Name and Signature			Date			
Project Manager Signature			Date			Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	4C		
Sample Date:	19/10/17		

Project Name:	Building Roo 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (galic/stick u.p):	(The correction to apply is probe dependent):		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable):		<input type="checkbox"/> Retrieved					Parameters	

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:44	0			2.37	546	6.95	-57.4	21.2	503	Mostly clear
14:47	1L			0.41	522	6.30	-67.3	20.0	471.3	0
14:50	2L			0.28	519	6.12	-55.5	20.0	469.2	
14:53	3L			0.22	517	6.05	-40.3	20.0	467.9	
14:56	4L			0.19	516	6.02	-25.1	20.01	467.1	
14:59	5L			0.17	515	6.00	-13.0	20.1	466.5	
15:02	6L			0.16	514	6.00	-11.3	20.0	465.9	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter).
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T32-A					
						Sample Date: 19/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size: Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.655m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 3.625m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
08:28	0			2.37	854	6.14	9.5	18.6	751	Slight sulphur odour slightly cloudy.	
08:31	1L			0.77	859	5.34	17.3	18.9	742		
08:32	2L			0.52	833	5.24	11.8	19.0	737		
08:37	3L			0.39	833	5.22	8.7	18.9	736		
08:40	4L			0.33	832	5.23	4.8	18.9	734	735	
08:43	5L			0.30	838	5.21	2.9	18.9	740		
08:46	6L			0.29	839	5.21	2.8	18.9	740		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: QW-DS					
						Sample Date: 19/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.235		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 5.95		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
09:55	0			1.70	962	5.82	27.3	18.4	838	Slightly turbid	
09:58	1L			0.39	968	5.54	37.9	18.5	845		
10:01	2L			0.24	963	5.50	46.4	18.1	837		
10:04	3L			0.22	957	5.49	48.0	18.0	830		
10:07	4L			0.21	957	5.49	48.9	18.0	829		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: B110				
						Sample Date: 19/10/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level: 19/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 1.38m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 5.61m		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent): <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11:12	0			0.91	356	4.70	132.6	19.5	319	<i>Tannin-stained, slight sulphur odour</i>
11:15	1L			0.32	353.1	4.64	134.2	19.3	314.4	
11:18	2L			0.22	343.8	4.68	129.5	19.2	305.7	
11:21	3L			0.20	349.8	4.71	119.1	19.2	310.7	
11:24	4L			0.19	351.5	4.70	117.3	19.3	313.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Man Roads		Project Location: Booliar Wetlands		Fieldwork Staff:		Bore / Location ID: Gw-D3					
						Sample Date: 19/10/17					
General Bore Information			Parameter info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 3.69m	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 7.12m	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
11:57	0			5.32	346.7	5.38	134.7	20.7	315.6 Mostly clear, slight sulphur odour		
12:00	1L			1.62	343.2	5.42	138.6	20.0	310.1		
12:03	2L			0.95	334.6	5.51	131.0	19.9	301.2		
12:06	3L			1.02	328.5	5.58	122.4	19.8	295.2		
12:09	4L			1.26	316.3	5.68	108.3	19.9	285.9		
12:12	5L			1.34	318.5	5.70	104.1	19.9	287.5		
12:15	6L			1.34	317.4	5.70	102.9		286.2		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Via (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Via (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Bealear Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D7			
						Sample Date: 19/10/17			
General Bore Information		Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101155	<input checked="" type="checkbox"/> Decontaminated	Sampling Method		Hydrasleeve info.			
Depth to GW (m-pvc): 3.22	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Low Flow: Pump rate:		Monitoring sequence followed (number in order):			
Bore Depth (m-pvc): 4.19	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	Intake depth:		Hydrasleeve Type:			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:44	0			8.14	1328	6.84	85.9	19.5	1185 Cloudy yellow
13:47	1L			7.22	1511	7.09	80.2	18.8	1335
13:50	2L			6.65	1688	7.09	82.2	18.8	1492
13:53	3L			6.30	1709	7.09	83.3	18.9	1507
13:56	4L			6.23	1597	7.10	84.0	18.9	1410 Run mostly clear
13:59	5L			6.20	1601	7.09	84.6	18.9	1416
					1601				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			Cover partially buried in limestone appears that some may have fallen in the well.		
Approval and Distribution									
Fieldwork Staff Signature		Date	Checker Name and Signature		Date				
Project Manager Signature		Date	Distribution: Project Central File						

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A2E			
						Sample Date: 23/10/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Mode: YSI Pro DSS		<input type="checkbox"/> Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			1.07	1201	7.30	-89.1	24.1	C NTU 11.6
	40cm			0.21	1229	6.93	-91.7	20.7	1129 152.3
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Fence post.

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan						
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:						
Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: AI						
Sample Date: 23/10/17		Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.		Decontamination						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-ovc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:					
	Key Type (if applicable):	<input type="checkbox"/> Retrieved			Hydrasleeve out					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
				0.20	1127	7.18	-150.5	20.9	C	NTU 27.7
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Bee'ar Wetlands		Fieldwork Staff:		Bore / Location ID: A7 N		Sample Date: 23/10/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			0.63	1191	7.28	-55	25°	C	12.4	19.5
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 23/10/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: N265-N2		Sample Date: 23/10/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)				Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			0.22	1204	7.30	-82	21.4	1121	18.9	
	50cm			0.15	1142	7.28	-115	19.2	1017	23.1	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:		Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrous	x 50 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads				Project Location: Boeliar Wetlands		Fieldwork Staff:		Bore / Location ID: F32		
								Sample Date: 23/10/17		
General Bore Information			Parameter Info.			Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm)	Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated	Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):	Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Decontaminated	Intake depth:		Monitoring sequence followed (number in order):		
Bore Depth (m-pvc):		Casing Radius (mm):	Corrected Redox: Y / N		<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging		
Depth to Product (m-pvc):		Cover Type (gallic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Instal time:	
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve in	
		Key Type (if applicable):	<input type="checkbox"/> Retrieved						Hydrasleeve out	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	30 cm			1.9	725	6.82	-30.7	22.7	C	NTU 36
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature			Date	Checker Name and Signature			Date			
Project Manager Signature			Date	Distribution: Project Central File						

FSM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: RD1A Sample Date: 23/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated <input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated <input type="checkbox"/> Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable <input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc)		Cover Type (gate/stick up)		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify) <input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):				<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):		
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			0.32	670	6.60	-60	18	C	NTU	517 103
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PN Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Belliar Wetlands		Fieldwork Staff:		Bore / Location ID: R01					
						Sample Date: 23/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)			<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):			<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
	30cm			0.52	677	6.62	-47.3	18	587	NTU 92	
Too polluted to profile											
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Via: (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Via: (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: Laura Fisher		Bore / Location ID: TUR			
Date of GW Level: 0.51		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 21/10/17			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)			
Bore Depth (m-pvc): 1.17		Casing Radius (mm):		Corrected Redox: Y / N		Decontamination			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		Sampling Method			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		Hydrasleeve Info.			
Key Type (if applicable):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:23	0			2.65	415.7	6.08	-10.7	19.3	slight sulphuric smell turbid
10:27	0.5			0.82	405.4	5.63	-32.7	18.5	
10:30	1.0			6.57	403.8	5.55	-44.6	18.5	
10:33	1.3			0.47	401.2	5.52	-49.6	18.5	
10:36	1.6			0.39	399.1	5.49	-53.4	18.4	
10:39	1.9			6.34	398.1	5.47	-56.0	18.4	
10:42	2.2			0.31	397.2	5.46	-59.4	18.4	
10:45	2.5			0.28	396.6	5.45	-62.3	18.5	
10:48	2.9			0.27	396.9	5.45	-64.7	18.4	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 21/10		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T3C			
						Sample Date: 24/10/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101186		<input type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 10.2m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 5.14m		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10.14	0			2.38	493.1	6.2	-7.9	21.6	slightly cloudy
10.17	0.3			0.80	479.0	6.09	-11.8	20.1	
10.20	0.6			0.46	478.9	6.03	-4.2	20.2	
10.23	0.9			0.35	472.0	6.00	-10.2	20.3	
10.26	1.2			0.26	471.3	5.98	-7.1	20.3	
10.29	1.5			0.25	471.3	5.97	-6.0	20.3	
10.32	1.9			0.25	471.1	5.97	-5.8	20.3	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Surface Water: Groundwater:

Bore / Location ID: D7

Sample Date: 24/10/17

Project Name: Building Roe 8 Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beelair Welllands Fieldwork Staff: Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level: <u>2.427</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): <u>7.54</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Instal. time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			

Calculated bore volume (L): Includes/ excludes bore annulus (circle) # purge volumes removed: Total purged volume (L):

Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2.13	0			3.51	461.7	6.38	37.2	20.6	clear, no odour
2.16	0.5			1.89	444.6	5.80	86.6	19.8	
2.19	1.0			1.55	441.7	5.67	115	19.4	
2.21	1.5			1.51	432.0	5.67	122.0	19.7	
2.24	2.0			1.52	427.3	5.65	129.0	19.7	
2.27	2.5			1.41	427.3	5.64	130.2	19.6	
2.30	3.0			1.33	423.5	5.64	130.9	19.7	
2.33	3.5			1.27	425.2	5.64	130.2	19.7	
2.36	4.0			1.26	428.2	5.64	129.6	19.7	

Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature: [Signature] Date: 24/10/17
 Checker Name and Signature: _____ Date: _____
 Project Manager Signature: _____ Date: _____
 Distribution: Project Central File

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Murdoch Uni Farm

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelieir Wetlands		Fieldwork Staff:		Bore / Location ID: D2		Sample Date: 24/10/17		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 1.65	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.565	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
12.30	0		0	1.43	613	6.18	82.3	22.1	turbid +	
12.33	0.3			0.54	566	6.16	96.9	19.1		
12.36	0.6			0.37	536	6.17	111.4	19.0		
12.39	0.9			0.32	545	6.16	113.9	18.8		
12.42	1.2			0.29	534	6.17	112.8	18.7		
12.45	1.5			0.26	527	6.17	110	18.8		
12.49	1.8			0.25	530	6.16	108.2	18.8		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature			Date	Checker Name and Signature			Date			
Project Manager Signature			Date	Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-DB		Sample Date: 26/10/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.				
Date of GW Level: 26/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 10.15		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 12.20		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Sampling Start Time: Hydrasleeve out			
Key Type (if applicable):		Retrieved <input checked="" type="checkbox"/>								Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle):		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
15:34	0			4.65	1022	6.02	11.8	18.8	C 906				
15:37	0.4			2.42	1077	6.12	-26.1	19.7	969				
15:40	1.1 L			1.91	1094	6.14	-38.0	19.9	989				
15:43	1.6 L			1.61	1114	6.14	-44.5	20.0	1007				
15:50	3.4 L			0.85	1085	6.10	-55.2	19.9	979				
15:55	4 L			0.61	1083	6.09	-57.8	19.9	977. Heavy rain in between sampling.				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous		1 x 50 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				1 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature:			Date: 26/10/17		Checker Name and Signature: _____			Date: _____					
Project Manager Signature: _____			Date: _____		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	BANK BH12		
Sample Date:	26/10/17		


Project Name:	Building Roo 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelilar Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve Info.		
Date of GW Level:	26/10/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	12.875	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:		
Bore Depth (m-pvc):	17.590	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Instal time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
		Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):				

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:47	0			9.99	244.2	5.80	178.9	18.1	C	
14:50	0.3			8.97	255.9	5.50	187.9	18.5	224.7 - Flow cell got blown over in wind.	
14:53	0.8			8.55	255.7	5.43	198.2	18.6	224.0	
14:56	1.6			8.51	255.2	5.43	203.5	18.6	224.1	
15:00	2.2			8.51	254.8	5.43	208.0	18.7	224.8 Cloudy, yellow. Nil odour.	
15:03				8.58	254.9	5.45	209.3	18.8	224.8	
15:06	3.2			8.59	254.9	5.45	211.1	18.9	224.6	

Acceptable Parameter Range:	± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic	N/A	

Approval and Distribution			
	26/10/17	_____	_____
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
_____	_____	_____	_____
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	A3		
Sample Date:	2/11/17		


Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGrathen
Client:	Main Roads	Project Location:	Beeliter Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Mode:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out:			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	10cm			2.82	382.1	6.41	-46.3	19.1	C	NTU 14.5

Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Viai (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc
		x 40 mL Viai (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	2/11/17		
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

ANZ

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

White Stake

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: FS4A		Sample Date: 2/11/17		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Rad us (mm):	Chem Kit Serial No.:	17H101156		<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)			<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved				Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm-or mg/L)	E.C. (mS/cm-or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odeur, Colour, Turbidity	
	30cm			1.22	740	6.80	-27	24.2	731	15
	40cm			0.30	740	6.68	-54	20.3	673	195
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HC)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 2/11/17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: FS2		Sample Date: 2/11/17		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity	
	15cm			2.47	743	6.92	-50	25	C	NTU 13.6
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Val (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Val (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 2/11/17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Bailliar Wetlands		Fieldwork Staff:		Bore / Location ID: RD 2A				
						Sample Date: 2/11/17				
General Bore Information		Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	Sampling Method		Hydrasleeve Info.				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	Intake depth:		Hydrasleeve Type:				
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in:			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):			Parameters			
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			0.31	701	6.55	-64.5	17.8	C	NTU
									606	180
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork/Staff Signature: 		Date: 2/11/17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

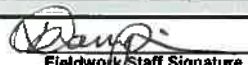
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Baillar Wetlands		Fieldwork Staff:		Bore / Location ID: A1					
						Sample Date: 2/11/17					
						Well Development or Well Sampling Event? (circle)					
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in:						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out:						
	Key Type (if applicable):	<input type="checkbox"/> Retrieved			Parameters						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	30cm			0.25	1218	7.26	-106.5	23.1	C	NTU	
	60cm			0.14	1220	7.0	-122	20.1	1173	872.4	
									1097	-0.3	
Acceptable Parameter Range:		±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 2/11/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrannan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: NLLS-N2					
						Sample Date: 2/11/17					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra					
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	15cm			4.57	1212	7.33	-47.8	25.8	1239	12.1	
	90cm			0.33	1224	7.18	-49.4	19.4	1092	10.4	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork/Staff Signature: 		Date: 2/11/17		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>AIN</u>					
						Sample Date: <u>2/11/17</u>					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101155		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra					
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	<u>200m</u>			<u>3.8</u>	<u>1212</u>	<u>7.37</u>	<u>-4.8</u>	<u>28.8</u>	<u>1302</u>	<u>23.4</u>	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>2/11/17</u>		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

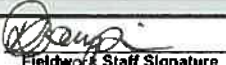
Q4AN(EV)-405-FM1

Project Name: Building Rob 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BL05-B1		Sample Date: 2/11/17						
General Bore Information			Parameter Info.			Decontamination			Sampling Method			Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
Key Type (if applicable):														
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters														
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity					
	50cm			9.71	1222	8.28	24.8	24.7	1219	6.7				
	30cm			9.98	1223	8.31	32.9	24.9	1219	14				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments					
Field Filtered:		Unfiltered:		x 40 mL Vial (HC)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution														
Fieldwork Staff Signature			Date			Checker Name and Signature			Date					
Project Manager Signature			Date			Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: A2		Sample Date: 2/11/17							
General Bore Information			Parameter Info.			Decontamination			Sampling Method			Well Development or Well Sampling Event? (circle)			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:			Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Decontaminated		Intake depth:			Hydrasleeve Type:		Monitoring sequence followed (number in order):		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Baller <input type="checkbox"/> Hydrasleeve			Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)			Sampling Start Time:		Hydrasleeve out		
Key Type (if applicable):				<input type="checkbox"/> Retrieved									Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):							
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity				
	30cm			9.93	1222	8.33	60.6	24.8°	1217	11.3					
Acceptable Parameter Range: ±10% DO, ±3% E.C., ±0.05 pH, ±10 mV Redox, ±0.2 °C Temp, ±10% turbidity (if using a turbidity meter)															
Analytes Sampled for:				Bottles Collected				QA/QC Information				Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 80 mL Ferrous		x 60 mL metals (HND)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic							
Approval and Distribution															
Fieldwork Staff Signature: 				Date: 2/11/17				Checker Name and Signature				Date			
Project Manager Signature				Date				Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: 5L 304y		Sample Date: 2/11/17		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Instal. time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mM/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTA Odour, Colour, Turbidity	
				9.61	1213	8.23	56.5	24.7	1205	2.8
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 2/11/17		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: B110		Sample Date: 3/11/2017			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 1.46		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.61		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer		<input checked="" type="checkbox"/> Hydrasleeve	
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent): <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterra		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)				Hydrasleeve Install time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Hydrasleeve info:	
										Monitoring sequence followed (number in order):	
										Gauging	
										Hydrasleeve in	
										Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
1:27			0.3	2.15	296	5.17	82	21.3	274.4, Brown, sulphur-		
1:30	2		0.3	0.45	286.1	5.04	102.1	19.9	258.2, Brown, organic matter		
1:33	3		0.3	0.51	287	5.00	118	20.0	257.5, Brown		
1:36	4		0.3	0.25	281.4	5.04	101	20	254		
1:39	5.1		0.3	0.22	283.9	5.17	79	20.1	260		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature			Date			Checker Name and Signature			Date		
Project Manager Signature			Date			Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: <i>TWCS</i>		Bore / Location ID: <i>T313</i>					
						Sample Date: <i>3/11/2017</i>					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <i>1.59</i>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): <i>8.85</i>	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time	Hydrasleeve out:			
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
<i>2.26</i>	<i>0</i>		<i>0.3</i>	<i>0.85</i>	<i>177.2</i>	<i>5.81</i>	<i>51.5</i>	<i>19.7</i>	<i>159.4</i>		
<i>2.29</i>	<i>2</i>		<i>"</i>	<i>0.28</i>	<i>170.3</i>	<i>5.86</i>	<i>42.2</i>	<i>20.2</i>	<i>153.7</i> <i>clear</i>		
<i>2.32</i>	<i>4</i>		<i>"</i>	<i>0.19</i>	<i>166.0</i>	<i>5.83</i>	<i>47.5</i>	<i>20.3</i>	<i>150.4</i>		
<i>2.35</i>	<i>5.5</i>		<i>"</i>	<i>0.16</i>	<i>164.4</i>	<i>5.82</i>	<i>49.3</i>	<i>20.2</i>	<i>149.2</i>		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Val (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Val (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date	Checker Name and Signature			Date					
Project Manager Signature		Date	Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 3/11/2017				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 5.33		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 10.83		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
Key Type (if applicable):										Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C			
12:52	0		0.3	2.46	520	5.99	1.6	22.5	470			
12:55	2			0.57	509	5.84	2.6	20.1	461			
12:58	3		0.3	0.45	508	5.83	6.3	20.3	461			
1:01	4		0.3	0.35	506	5.83	7.3	20.2	460.5			
1:04	5.1			0.29	505	5.83	7.0	20.3	460.2			
1:07	6.5			0.26	505	5.84	6.9	20.3	459.1			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:			x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc
		x 40 mL Vial (H ₂ SO ₄)			x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

<input type="checkbox"/> Surface Water:		<input checked="" type="checkbox"/> Groundwater:								
Bore / Location ID: AWDS		Sample Date:								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Fieldwork Staff: TW CS							
Client: Main Roads	Project Location: Beellar Wetlands	Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.27	Screen Interval (m):	Chem Kit Mode: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Sampling Depth (m-pvc):		
Bore Depth (m-pvc): 5.96	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out:		
Key Type (if applicable):	<input type="checkbox"/> Retrieved	Total purged volume (L):		Total purged volume (L):		Sampling Start Time:		Hydrasleeve out:		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):		Sampling Start Time:		Hydrasleeve out:		
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	S.P.C. (mg/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
09:33	0	0	0.3/m	0.98	209	5.52	23.1	18.6	1062	Slightly turbid.
09:36	1			0.31	1213	5.39	22.9	18.5	1060	Sulphur smelt
09:39	2			0.21	1192	5.35	25.8	18.4	1039	
09:42	3			0.18	1166	5.34	27.3	18.2	1018	
09:45	4			0.16	1144	5.32	30.4	18.3	1000	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL P.astic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature TW		Date		Distribution: Project Central File		
Project Manager Signature		Date								

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A		Sample Date:						
General Bore Information			Parameter Info.			Decontamination			Sampling Method			Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:			Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.72		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:			Hydrasleeve Type:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 3.61		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve			Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra					Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)					Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved									Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):								
Water Quality Parameters														
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity					
8:42	0		0.3/min	3.18	795	5.38	25.9	19.5	700	Clear, sulfur smell				
8:45	1		" "	0.41	791	5.12	19.1	19.1	702					
8:48	2		" "	0.25	797	5.12	13.6	19.2	709					
8:51	3		✓	0.20	799	5.11	12.4	19.1	709					
8:54	4		✓	0.18	811	5.11	11.6	19.1	709					
8:57														
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:		Bottles Collected				QA/QC Information			Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic										
Approval and Distribution														
Fieldwork Staff Signature				Date		Checker Name and Signature				Date				
Project Manager Signature				Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff: TW CS		Bore / Location ID: QWD3			
						Sample Date: 3/11/2017			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 3.77	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc): Gauging			
Depth to Product (m-pvc): 7.13	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time: Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sp. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
8:12	0		0.3/mh	1.46	356	5.63	102.2	19.7	321.6 Clear
8:15	1.2		" "	0.55	350	5.58	110.2	19.8	317.8 Clear
8:18	2.5		" "	0.50	343.8	5.39	110.4	19.8	309.1 Clear
8:21			" "						
8:24	3.5		✓	0.56	328.3	5.58	95.0	19.7	296.4
8:27	4.5		✓	0.56	329.2	5.61	93.2	19.9	296.4
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date	Checker Name and Signature		Date				
Project Manager Signature		Date	Distribution: Project Central File						

ANZ

FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW CS		Bore / Location ID: T2F			
						Sample Date: 3/11/2017			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.24		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 4.16		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV/cm or µS/cm)	pH	Redox (mV/ORP)	Temp °C	Odour, Colour, Turbidity
9:10			0.3/m	1.93	843	5.82	-13.2	17.5	740
9:13	2		" "	0.35	857	5.81	-14.9	18.2	746
9:16	3		" "	0.24	856	5.82	-17.0	18.2	744
9:19	4		" "	0.19	855	5.82	-18.7	18.2	744
9:22	5		" "	0.16	856	5.82	-20.1	18.2	746
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 80 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ
FQM - Groundwater Sampling and Purging Record

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<input type="checkbox"/> Surface Water:		<input type="checkbox"/> Groundwater:								
Bore / Location ID: GW-04		Sample Date: 3/11/12								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Fieldwork Staff: TW CS							
Client: Main Roads	Project Location: Beelihar Wetlands	Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 29.5cm	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 3.90m	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5°C E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:28			0.3	3.80	258.0	5.93	98	19.7	228.3	
10:31	1		" "	2.44	258.2	5.94	115.95	19.2	229.9	
10:34	2.5		" "	1.97	259.5	5.93	122.2	19.3	231.5	Slightly turbid
10:37	3.5		" "	1.95	258.7	5.93	124.4	19.3	230.2	
10:40	5		" "	2.04	258.7	5.92	127.5	19.3	229.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Via ¹ (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Via ¹ (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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Project Name: Building Roe 8		Project Number: 6D478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: TWCS		Bore / Location ID: T4B					
						Sample Date: 3/11/2017					
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 64cm		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 2.115m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Hydrasleeve Start Time:		Hydrasleeve out	
		Key Type (if appl cable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
11-	0		0.3 L/min	3.12	455.6	5.29	17.1	20.2	405.4	Slightly turbid	
11:03	1			0.50	450.7	5.23	-21.2	18.7	396.4	Strong sulfur smell.	
11:06	2			0.31	450.2	5.23	-40.5	18.9	397.6		
11:09	3			0.25	449.3	5.23	-47.3	18.8	395.8		
11:12	4			0.23	449.1	5.23	-51.8	18.8	395.6		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beel'iar Wetlands		Fieldwork Staff:		Bore / Location ID: 75C							
						Sample Date: 3/11/2017							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 10cm		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 5.155		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
1:56	0		0.3	0.66	2095	4.84	112	18.4	1484				
2:01	2.5			0.20	533	5.25	657	18.4	454				
2:04	5			0.16	4650	5.25	70.2	18.5	401				
2:07	6			0.14	4399	5.25	71.8	18.5	383.7				
2:10	7			0.13	433	5.25	72-	18.6	380-				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature			Date			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

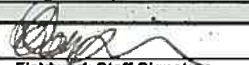
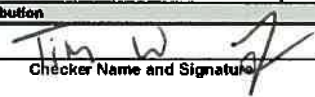
Q4AN(EV)-405-FM1

Project Name: Building Roa B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Baaliar Wetlands		Fieldwork Staff:		Bore / Location ID: D1				
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 6/19/17		Bore Radius (m,m):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Low Flow: Pump rate:				
Depth to GW (m-pvc): 2.515		Screen Interval (m):		Chem Kit Mode: YSI Pro DSS		<input checked="" type="checkbox"/> Intake depth:				
Bore Depth (m-pvc): 6.54		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
Key Type (if applicable):						<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR SS. (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
9:02	0			3.03	501	6.12	64.4	20.1	450.3	Clear, nil odour.
9:05	1L			0.53	492.2	5.56	85.8	19.5	440.2	
9:08	2.3L			0.30	497.0	5.52	94.4	19.4	444.0	
9:11	3.4L			0.25	490.0	5.51	94.3	19.5	437.0	
9:14	4.3L			0.22	464	5.45	85.5	19.5	415	
9:17	5.5L			0.19	464	5.46	75.0	19.6	416	
9:20	6.7L			0.18	464	5.46	75.5	19.6	416	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: D2							
						Sample Date: 6/10/17							
General Bore Information				Parameter info.		Decontamination							
Date of GW Level: 6/11/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 1.75		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 5.57		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (cap/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):				<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SEC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
8:40	0		0.3/l/min	2.85	629	6.35	17.7	20.1	S60 Clear				
8:43	1.2			0.40	602	6.03	40.3	19-	S33				
8:46	2.4			0.24	605	5.96	50.8	19-	S36				
8:49	3.6			0.20	600	5.94	56.2	19.1	S31				
8:52	4.9			0.18	592	5.95	58.6	19.1	S24				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature: 			Date: 6/11/17			Checker Name and Signature: 			Date: 6/10/17				
Project Manager Signature: _____			Date: _____			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chr's McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-DB					
						Sample Date: 6/16/17					
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 6/16/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 10.15	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth: 11m		Hydrasleeve Type:				
Bore Depth (m-pvc): 11.96	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gal/c/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
7:52	0			5.05	1144	6.66	-53.8	23.7	1117		
7:56	0.7L			1.58	1193	6.19	-71.0	21.5	1112 strong sulphur odour, slightly turbid.		
8:00	1.5L			1.09	1196	6.14	-74.0	21.3	1111		
8:04	2.3L			0.86	1202	6.10	-75.5	21.2	1114		
8:08	3.1L			0.71	1201	6.06	-77.6	21.3	1117		
8:12	4.0L			0.58	1210	6.02	-78.9	21.3	1124		
8:16	4.9L			0.49	1206	6.01	-78.1	21.4	1124		
8:20	5.6L			0.48	1204	6.02	-78.2	21.3	1120 mostly clear		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 6/16/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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Q4AN(EV)-405-FM1

Project Name: Building Rce 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: Gw-D7			
						Sample Date: 6/14/17			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 6/11/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc): 3.265	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 4.16	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
7:32	0			6.38	1264	7.36	104.1	19.4	1147
7:35	1L			5.75	1240	7.13	99.1	19.3	1105
7:38	2L			5.69	1254	7.10	99.5	19.3	1118
7:41	3L			5.51	1236	7.07	100.6	19.3	1102
7:44	4L			5.38	1240	7.06	101.0	19.3	1107
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date: 6/14/17		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					



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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGragan							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:							
Bore / Location ID: BH 12		Sample Date: 6/10/17		Well Development or Well Sampling Event? (circle) <input checked="" type="checkbox"/> <input type="checkbox"/>							
Date of GW Level: 6/10/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156							
Depth to GW (m-pvc): 12.94		Screen Interval (m):		Chem Kit Model: YSI Pro DSS							
Bore Depth (m-pvc): 17.54		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N							
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved							
Key Type (if applicable):											
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:							
				Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9:43	0L			8.59	287.5	5.74	128.7	25.1	287 Cloudy & milky yellow		
9:46	-			8.65	282.9	5.62	148.1	25-	283 plug came out - no power.		
9:51	0.7L			8.87	275.5	5.51	164.9	25.1	275.0		
9:55	1.5L			8.80	271.4	5.47	173.8	24.6	269.6		
9:59	2.0L			8.98	271.0	5.47	177.5	25.1	270.7		
10:03	2.5L			11.88	270.0	5.51	181.2	24.8	270.4		
10:07	3.0L			11.52	271.3	5.67	176.0	25.6	270.5		
10:11	3.5L			10.95	270.2	5.74	172.5	25.3	270.7		
10:15	4.0L			10.81	269.8	5.72	175.8	25.3	270.7		
10:19											
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (H ₂ NO ₂)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 6/11/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: B112		Sample Date: 21/11/17		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 12.965	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): 17.26	Casing Radius (mm):	Corrected Redox:	Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)			<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out:	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5 #.C. (m8/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity	
9:07	0			9.32	313.7	6.56	102.3	25.6	321.9	Cloudy, turbid, yellow sand
9:10	0.1			9.58	297.7	6.21	133.6	24.6	294.8	colour
9:13	0.4			8.05	273.9	6.16	145.3	24 -	273.5	
9:24	0.6			7.99	260	6.14	148.2	25.6	263.7	
9:26	1			7.91	259.6	6.06	154.7	26.7	266.9	
9:29	1.3			8.15	258.3	6.04	159.5	25.0	254.9	
9:35	2			8.46	238.8	6.05	165.1	23.8	234.9	
9:41	2.7			8.52	233.3	6.00	173.6	23.7	227.5	
9:47	3.1			8.46	234	5.97	177.8	24 -	228.9	
9:52	4.			8.71	235.9	5.93	181 -	22.6	225.8	
9:57	4.5			8.68	237.4	5.89	181.4	23.4	230.5	
10 -	4.8			8.68	239.3	5.89	180.5	23.5	231.7	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 21/11/17		Checker Name and Signature: 		Date: 21/11/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 21/11/17			
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 21/11/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.43		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 10.83		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
Key Type (if applicable):										Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
8:07	0		0.4/min	3.86	532	6.89	-51.5	20.2	475.2 Clear, slight sulfur odour.		
8:10	1.2			0.75	519	6.26	-18.4	19.9	468.6		
8:13	2.2			0.46	518	6.16	-10.7	19.9	468.2		
8:16	3.2			0.35	517	6.10	-5.1	20-	468.2		
8:19	4.3			0.32	516	6.07	-3.8	20-	466.3		
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous		1 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature:		Date: 21/11/17		Checker Name and Signature: Tim W		Date: 21/11/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

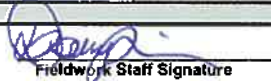

FQM - Groundwater Sampling and Purging Record

Project Name: Building Rca 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: TSH10		Sample Date: 20/11/17		
General Bore Information			Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate		Hydrasleeve Size:
Depth to GW (m-pvc): 1.59		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:
Bore Depth (m-pvc): 5.625		Casing Radius (m:m):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
1:03	0		0.3/min	1.05	290.1	6.61	6.55	22.1	267 Tea Colour	
1:06	1.2			0.46	266.8	5.85	-14.7	22.6	253.7	
1:09	2.4			0.43	270.2	5.80	-16.7	22.9	257.3	
1:12	3.2			0.45	275.2	5.77	-18.7	22.9	264.4	
1:15	4.5			0.46	270.4	5.73	-19.1	22.9	259.4	
1:18	-									
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 120 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <i>[Signature]</i>		Date: 20/11/17		Checker Name and Signature: <i>[Signature]</i>		Date: 20/11/17				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Ree B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T3C				
						Sample Date: 20/11/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 15m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 5.13m		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve				
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Walerra				
						<input checked="" type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
1:28	0			1.04	449.7	5.54	15.8	18.8	392.1	Turbid.
1:31	1.2			0.30	361	5.47	55.0	18.1	313	
1:34	2.6			0.22	355	5.41	77.7	18.1	307.7	
1:37	3.8			0.20	353.3	5.40	81.2	18-	306.3	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 20/11/17		Checker Name and Signature: 			Date: 20/11/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GND-D7			
						Sample Date: 20/11/17			
General Bore Information				Parameter info.		Decontamination			
Date of GW Level		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 3.32m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 4.10m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Watera			
		Key Type (if applicable):				<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
01:59	0		0.3/min	6.12	1261	6.73	52.1	20.4	1154 Turbid, cloudy
2:02	1.2			5.14	1308	7.03	52.2	20.1	1185
2:05	2.4			4.71	1339	7.05	56.4	20 -	1208
2:08	3.6			4.68	1319	7.02	61 -	19.9	1191
2:11	4.8			4.67	1307	7.04	66.4	20.0	1183
2:14	5.5			5.13	1236	7.07	68.6	20 -	1113
2:17	6.8			4.97	1273	7.06	70.5	20.1	1150
2:20	8			4.70	1312	7.04	67.3	20.1	1185 YSI fell over, sampled.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)	WQA01		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic	2x extra Amber.		Limestone covering bore hole. Small amount of limestone fell into well when cover was removed.		
Approval and Distribution									
Fieldwork Staff Signature:		Date: 20/11/17		Checker Name and Signature: Tim W J		Date: 20/11/17			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D8				
						Sample Date: 20/11/17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101158		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 10.18m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 11.93m		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
02:36	0		0.2/min	1.40	1076	6.64	-71.2	22.9	1039	
02:39	0.8			0.65	1070	6.52	-83.0	21.6	997	
02:42	1.5			0.53	1069	6.45	-82.7	21.3	997	
2:45	2.2			0.45	1090	6.38	-82.1	21.2	1010	
2:48	3.0			0.41	1081	6.32	-80.2	21.1	1000	
2:51	4.5			0.40	1073	6.30	-80.3	21-	981	
2:54				0.38	1055	6.28	-79.1	21-1	973	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 			Date: 20/11/17		Checker Name and Signature: Tim W J			Date: 20/11/17		
Project Manager Signature:			Date:		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A			
						Sample Date: 17/11/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 17/11/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.835		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 3.63		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2:49	0			1.29	887	5.44	48.4	20.5	800 Slightly turbid, sulfur odour
2:52	1.2			0.31	859	5.24	10.6	19.6	770
2:55	2.4			0.22	856	5.25	2.2	19.5	765
2:58	3.6			0.19	856	5.26	-4.1	19.5	766
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 17/11/17		Checker Name and Signature: T.M.W.		Date: 17/11/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Project Name: Building Rco 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Boelliar Wetlands		Fieldwork Staff:		Bore / Location ID: T3B				
						Sample Date: 17/11/17				
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)			
Date of GW Level: 17/11/17		Bore Radius (mm):		Cham Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 1.680		Screen Interval (m):		Chem Kit Model YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Hydrasleeve Size:		
Bore Depth (m-pvc): 3.85m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		Hydrasleeve Type:		
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):		Hydrasleeve info.		
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
03:14	0		03	1.23	184.3	5.97	23.8	20-	165.8	Cloudy / turbid
03:17	1.2			0.42	174.2	6.01	2.1	20-	156.1	
03:20	2.4			0.27	159.6	5.97	4.7	20-	143.9	
03:23	3.6			0.24	157.4	5.93	9.3	20-	142.3	
03:26	4.8			0.23	156.7	5.94	11.9	20.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 80 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 17/11/17		Checker Name and Signature:		Date: 17/11/17				
Project Manager Signature:		Date:		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: Groundwater:

Bore / Location ID: GW-05

Sample Date: 17-11-17

Well Development or Well Sampling Event? (circle)

Project Name: Building Roe B Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beelihar Wetlands Fieldwork Staff:

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):
Dopth to GW (m-pvc): <u>2.38</u>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	
Bore Depth (m-pvc): <u>5.94</u>	Casing Rad us (mm):	Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gaug ng
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydras'eeve in
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):		

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	BWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
2:30	0		0.3l/min	0.71	1144	5.66	13.2	21.4		1102
2:33	1.2			0.30	1221	5.50	33.9	19.3		1087
2:36	2.4			0.24	1212	5.47	40.6	19.3		1081
2:39	3.5			0.19	1211	5.45	43.3	19.4		1081
2:42	4.5			0.18	1206	5.44	43.7	19.4		1076

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature: [Signature] Date: 17/11/17
 Checker Name and Signature: Tim W Date: 17/11/17
 Project Manager Signature: _____ Date: _____
 Distribution: Project Central File

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T&F			
						Sample Date: 17/11/17			
General Bore Information				Parameter Info		Decontamination			
Date of GW Level: 17/11/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.34		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 4.16		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2:08	0			4.08	855	6.00	-11.7	20.8	783 Slight sulfur odour
2:11	1.3			0.48	876	6.10	-73.2	18.3	765 Clear.
2:14	2.6			0.32	896	6.01	-68	18.6	786
2:17	4			0.27	889	5.98	-58.9	18.6	781
2:20	5.1			0.24	887	5.98	-50.1	18.6	778
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature:		Date: 17/11/17		Checker Name and Signature:		Date: 17/11/17			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FGM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beel'ar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-03		Sample Date: 17-11-17			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 3.86	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 7.20	Screen Interval (m.):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
Key Type (if applicable):									Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWM (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
12:18	0		0.3/min	1.29	372.5	5.59	42.2	20.5	331.3		Clear, no odour.
12:21	1.2			0.45	366.8	5.43	69.8	20.0	331.7		
12:24	2.4			0.30	362.7	5.45	77.6	20.0	328.3		
12:27	3.6			0.25	359.4	5.45	83.6	19.9	323.6		
12:30				0.23	350.3	5.50	86-	19.9	314.4		
Acceptable Parameter Range:											
				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 17/11/17		Checker Name and Signature: 		Date: 17/11/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: Groundwater:

Bore / Location ID: T4B
 Sample Date: 17/11/17

Project Name: Building Roe B Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beelair Wetlands Fieldwork Staff: Well Development or Well Sampling Event? (circle)

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>0.725m</u>	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging	
Bore Depth (m-pvc): <u>2.12m</u>	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					

Calculated bore volume (L): Includes/ excludes bore annulus (circle) # purge volumes removed: Total purged volume (L):

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11:52	0		0.3/min	4.05	460	5.64	-0.8	21.3	411.3	Turbid, Sulphur odour.
11:55	1.2			0.34	454.2	5.41	-24.2	19.2	403.8	
11:58	2.5			0.28	454.0	5.41	-29.6	19.2	404.5	
12:01	3.8			0.25	454.0	5.40	-38.1	19.2	403.3	
12:04	5.2			0.22	453.7	5.40	-43.7	19.2	403.1	

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Val (HCl)	1 x 60 mL Ferrous	1 x 80 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc
		1 x 40 mL Val (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature: [Signature] Date: 17/11/17
 Checker Name and Signature: [Signature] Date: 17/11/17
 Project Manager Signature: _____ Date: _____
 Distribution: Project Central File

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: D2							
						Sample Date: 17/11/17							
General Bore Information				Parameter Info.		Decontamination							
Date of GW Level: 17/11/17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc): 1.835		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated							
Bore Depth (m-pvc): 5.56		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve							
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra							
						<input checked="" type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
10:28	0		0.3/min	3.50	606	7.55	103-	19.7	546 No odour, slightly turbid				
10:31	1.5			1.86	577	6.44	123.9	19.3	514				
10:34	2.8			1.62	570	6.33	125.7	19.3	508				
10:37	4			1.48	563	6.29	123.3	19.3	502				
10:40	5.3			1.37	553	6.28	119.1	19.3	488				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:		Unfiltered:		x 40 µL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 µL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature:			Date: 17/11/17			Checker Name and Signature:			Date: 17/11/17				
Project Manager Signature:			Date:			Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		FM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: <u>D7</u>			
						Sample Date: <u>17/11/17</u>			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): <u>2.62</u>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc): <u>6.535</u>	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:51	0		0.3/min	1.28	533	6.27	86.1	19.8	478.3 Clear, No odour.
10:54	1			0.57	527	5.83	106.2	19.7	471.9
10:57	2.1		~	0.32	516	5.73	112.9	19.6	464.1
11:00	3.5			0.27	505	5.69	116.1	19.7	453.2
11:03	4.5			0.25	498.3	5.67	114.4	19.6	446.4
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>17/11/17</u>		Checker Name and Signature: <u>T.M. W [Signature]</u>		Date: <u>17/11/17</u>			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 50478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D4		Sample Date: 17/11/17			
General Bore Information					Parameter Info.		Decontamination		Sampling Method		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 0.39m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 3.92m		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):										Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC E.O. (mBiom or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
11:18	0			3.31	258.6	6.27	64.3	20.7	C		
11:21	1.2			2.10	259.6	6.07	102	19.6	232.5		
11:24	2.6			1.89	261.9	6.05	117.2	19.6	235.0		
11:27	4.2			2.04	260.3	6.03	124.3	19.5	233.3		
11:30	5.9			2.26	259.2	6.03	130	19.6	232.9		
11:33	7.4			2.59	256.4	5.99	135.5	19.5	229.3		
11:36	9.1			2.45	256.2	5.99	134.5	19.6	231.1		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	1 x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature:		Date: 17/11/17		Checker Name and Signature:		Date: 17/11/17					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: <i>32-Jetty</i>		Sample Date: <i>17/11/17</i>					
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc)		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <i>N</i>		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/st c.k up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in:		Hydrasleeve out	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out:		Parameters	
Key Type (if applicable):		Parameter method: <input type="checkbox"/> Retrieved											
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP 50 (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity				
	<i>20cm</i>			<i>5.3</i>	<i>1348</i>	<i>8.1</i>	<i>74.2</i>	<i>23.4</i>	<i>1307</i>	<i>NTU</i>	<i>3.9</i>		
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)													
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous		2 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				1 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 250 mL Plastic					
				<i>(Chlorophyll)</i>									
Approval and Distribution													
Fieldwork Staff Signature: <i>[Signature]</i>			Date: <i>17/11/17</i>			Checker Name and Signature: _____			Date: _____				
Project Manager Signature: _____			Date: _____			Distribution: Project Central File							

ANZ

FSM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: A25			
						Sample Date: 17/11/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
						<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRP E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	15cm			5.19	1356	7.98	69.5	23.1	C NTU 10.9
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL P'astic					
		Chlorophyll							
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chris McGraghan	
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff:	

Surface Water: <input type="checkbox"/>	Groundwater: <input checked="" type="checkbox"/>
Bore / Location ID: BLOS-B2	Sample Date: 17/11/17

General Bore Information		Parameter Info.	Decontamination	Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):	Cover Type (gal/c/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Watera	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify):	<input checked="" type="checkbox"/> Other (specify):		Sampling Start Time:	Hydrasleeve out
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters

Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
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Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV/cm or $\mu\text{S/cm}$)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	20cm			1.46	1357	7.67	-81.8	25.6	C NTU 5.0

Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)	WQA02		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic	2x extra Amber		
		1 Chlorophyll					

Approval and Distribution			
Fieldwork Staff Signature: _____	Date: 17/11/17	Checker Name and Signature: _____	Date: _____
Project Manager Signature: _____	Date: _____	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: 27			
						Sample Date: 15/11/17			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle):		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (open or mg/L)	SP E.C. (microhm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	20cm			0.91	429.9	6.74	55.4	20.5	C NTU 55.7
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc		
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic					
		1 (Chlorophyll)							
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: F52						
						Sample Date: 15/11/17						
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Baller <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR50 (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	30cm			0.67	825	6.72	-89.5	21.9	C	NTU	151	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:		Unfiltered:		1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous		2 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				1 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 250 mL Plastic				
				Chlorophyll								
Approval and Distribution												
Fieldwork Staff Signature			Date			Checker Name and Signature			Date			
Project Manager Signature			Date			Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan				
Client: Main Roads				Project Location: Bealliar Wetlands		Sample Date: 15/11/17				
Bore / Location ID: A1				Well Development or Well Sampling Event? (circle)						
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out:		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.EC _m (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C, NTU, O ₂ , Colour, Turbidity	
	20cm			0.55	1395	7.30	-50.1	23.2	1334	292
	40cm			0.17	1373	7.16	-96	21.1	1269	-0.1
Acceptable Parameter Range:										
		±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)		1	x 60 mL Ferrous	2	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		1	x 40 mL Vial (H ₂ SO ₄)	1	x 100 mL Amber	1	x 250 mL Plastic			
		1	Chlorophyll							
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roo 8		Project Number: 60478410		PM Name: Chris McGrathnan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: N4WS-N2					
						Sample Date: 15/11/17					
General Bore Information				Parameter Info.		Decontamination					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated					
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated					
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra					
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP-ES ₂ (mM/cm or μS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	20cm			0.60	1386	7.28	-44.1	21.1	1283	6.8	
	60cm			0.50	1390	7.23	-47.6	20.6	1272	6.9	
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Amber	1 x 250 mL Plastic							
		1 <u>Woodpecker</u>									
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: RD1		Sample Date: 15/11/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pra DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Monitoring sequence followed (number in order):
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in:
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out:
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SVA (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPCO (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity	
	20cm			3.89	710	6.44	-49.7	18.2°	617	54.5		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc RD1A - too shallow to sample		
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic				
				x 40 mL Vial (H ₂ SO ₄)								
Approval and Distribution												
Fieldwork Staff Signature: <i>[Signature]</i>			Date: 15/11/17			Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____			Date: _____			Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60476410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>							
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: AIN							
						Sample Date: 15/11/17							
General Bore Information				Parameter Info		Decontamination							
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated							
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated							
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / (N)		<input type="checkbox"/> Disposable							
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve							
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra							
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC (µS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
	15cm			0.23	1332	6.63	118.3	25.9	C NTU 157.3				
Acceptable Parameter Range:		±10%		±3%		±0.05		±10 mV		±0.2 °C		±10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:		1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous		2 x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				1 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber		1 x 250 mL Plastic					
				1 Chlorophyll									
Approval and Distribution													
Fieldwork Staff Signature			Date: 15/11/17			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: A12		Sample Date: 15/11/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/>		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mS/cm or μS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	20cm			0.16	1369	7.03	-120.9	22.9°C	C	NTU		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)			
Analytes Sampled for:			Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:		1 x 40 mL Vial (HCl)	1 x 60 mL Ferrous	2 x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
			1 x 40 mL Vial (H ₂ SO ₄)	1 x 100 mL Ambar	1 x 250 mL Plastic							
			1 Chromogly II									
Approval and Distribution												
 Fieldwork Staff Signature		15/11/17 Date		_____ Checker Name and Signature				_____ Date				
_____ Project Manager Signature			_____ Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: A1E		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR 5-0 (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
7:44	20cm			0.52	157A	7.38	-74.6	18.0	C	NTU	
									Too shallow to profile.		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: B4 Jetty		Sample Date: 1/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):				<input type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
15cm				11.90	1352	10.5	43	19.2	C	NTU	1197	123
30cm				11.00 0.41	1349	10.37	37.8	19.1			1196	240
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. Very windy conditions, water chopped up.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: A3N		Sample Date: 1/12/17									
Project Name: Building Roe B	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)								
Client: Main Roads	Project Location: Beeliar Wetlands	Fieldwork Staff:									
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved			Hydrasleeve out Parameters						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	1.5m			1.23	1583	7.58	-2.3	17.3°	C	NTU 226.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments					
Field Filtered:	Unfiltered:	x 40 mL V.a.l (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL V.a (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: NWS-N2		Sample Date: 1/2/17									
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)								
Client: Main Roads	Project Location: Beeliar Wetlands	Fieldwork Staff:									
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterloo	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	20cm			680 1.19	1584	7.43	-28.7	18.9	C	NTU 19.6	
	60cm			1.10	1584	7.44	-62.2	19.0	1402	16.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: A1		Sample Date: 1/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Inlake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/st'ck up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	20cm			0.61	1580	7.36	-46.8	19	C	1401	NTU	33
	45cm			0.32	1578	7.34	-81	19		1397		4.2
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL, Ambar	x 250 mL, Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BL05-B1		Sample Date: 1/12/17			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	20cm			11.68	1354	10.42	-92.5	18.9	C	NTU	
	60cm			8.27	1336	9.96	-105.5	18.8	1183	96	130
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Surface Water:		<input type="checkbox"/>		Groundwater:		<input checked="" type="checkbox"/>				
Bore / Location ID:				A25						
Sample Date:				1/12/17						
Project Name:		Building Roe 8		Project Number:		6D47B410				
Client:		Main Roads		PM Name:		Chris McGraghan				
Project Location:		Beeliar Wetlands		Fieldwork Staff:						
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved				Sampling Start Time:		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			14.17	1364	10.66	-81	19.4	C 1285	NTU 154
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				
Approval and Distribution										
Fieldwork Staff Signature			Date		Checker Name and Signature			Date		
Project Manager Signature			Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Bore / Location ID:		F52	
Project Name: Building Roe B		Project Number: 80478410	
Client: Main Roads		Project Location: Beellar Wetlands	
PM Name: Chris McGraghan		Sample Date: 1/12/17	
Fieldwork Staff:		Well Development or Well Sampling Event? (circle)	
General Bore Information		Parameter Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Peristaltic Pump
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Waterra
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):
Water Quality Parameters			
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate
	15cm		
		DO (ppm or mg/L)	SR E6 (mS/cm or µS/cm)
		0.39	993
		pH	Redox (mV)
		7.24	-53.6
		Temp °C	Temp °C
		17.7	17.7
			C
			NTU
			854
			78
Acceptable Parameter Range:			
	± 10%	± 3%	± 0.05
		± 10 mV	± 0.2 °C
			± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber
			x 250 mL Plastic
QA/QC Information			
Field Comments			
Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: PS4A		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SC E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
	15cm			0.39	997	7.06	-89.5	18	864	NTU 800	Too shallow to profile
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Via ¹ (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Via ¹ (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Bee'lar Wetlands		Fieldwork Staff:		Bore / Location ID: South SI		Sample Date: 1/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity	
	5cm			0.6	452.4	7.3	-69.6	15.4	369.3	852	Very shallow	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL, Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D4		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 0.44m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 3.90m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/st ck up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		
9:33	0L			3.90	256	7.61	33.1	19.9	230	Nil odour, slightly turbid.	
9:36	1.2L			3.01	246.2	6.42	80.8	19.9	222.3		
9:39	3L			3.23	245.5	6.14	99.1	19.9	221.9		
9:42	4.2L			3.34	247.7	6.04	105.3	20.0	224.0		
9:45	5.6L			3.19	250.2	6.01	106.1	20.0	226.3		
9:48	6.8L			3.09	249.5	6.00	105.8	20.0	225.5		
9:51	8.0L			3.11	249.7	5.99	106.7	20.0	225.8		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: T30		Sample Date: 1/12/17							
Project Name: Building Roe 8	Project Number: 80478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)						
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff:							
General Bore Information		Parameter Info.	Decontamination						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated						
Depth to GW (m-pvc): 0.27	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated						
Bore Depth (m-pvc): 5.135	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra						
	Key Type (if applicable):	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:11	0		0.3/min.	2.04	405.2	5.90	-29.3	19.2	349.8 Clear, slight Sulfur odour.
10:14	0.9			0.40	366.6	5.47	-6.7	19.5	329.3
10:17	2.			0.30	365-	5.42	-6.1	19.9	329.7
10:20	3			0.27	364.4	5.41	-7.8	20.2	331.5
10:23	4			0.26	365.2	5.42	-9.6	20.5	333.9.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T3B		Sample Date: 1/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.79		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 8.835		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP E.C. (mV/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
10:36	0			3.12	199.9	6.05	-34.6	20.7	175.6	Cloudy, slight sulphur odour		
10:39	1.3L			0.40	156.1	5.92	-45.3	19.9	140.7			
10:42	2.5L			0.30	146.2	5.89	-32.5	19.9	131.9			
10:45	3.6L			0.26	144.3	5.85	-22.3	19.9	130.3			
10:48	5 L			0.23	143.7	5.85	-17.4	20.0	129.9			
10:51	6.2L			0.22	143.6	5.84	-15.0	20.0	129.8			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 130 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH10		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 1.65m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 5.605m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SRB-G: (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:53	0		0.3/min	1.61	250.5	6.18	-63.1	21.9	C Tea coloured, sulphur odour		
11:00	2			0.19	247.7	6.17	-94.3	22.4	234.9		
11:03	3			0.16	239.3	6.16	-95.3	22.4	239.2		
11:06	4			0.15	237.7	6.15	-95.5	22.5	226.5		
11:09	5			0.14	238.8	6.16	-98.4	22.7	228.3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amiser	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-03		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 3.88		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 7.125		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
1-	0		0.31/min	4.70	366.6	5.67	65.9	21.4	339.3 Clear, no odour		
1:03	1			3.66	358-	5.51	112.5	20.9	328.7		
1:06	2			3.43	355-	5.50	115.3	20.9	327.1		
1:09	3			3.13	353.1	5.50	109.6	21-	324.9		
1:12	4			2.97	351.6	5.55	102-	21.1	325.6		
1:15	5			2.77	351.2	5.58	96.3	21.0	326.7		
1:18	6			2.26	354.2	5.64	87.2	21-	327.5		
1:21	7			1.82	354.3	5.65	86.1	21.2	329-		
1:24	8			1.34	354.3	5.64	85.4	21.2	328.6		
1:27	9			1.35	355.3	5.65	84.0	21.2	328.9		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathar		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: M. D2		Sample Date: 1/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101158		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.91		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 5.57		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole						Sampling Start Time:		Parameters
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
14-	0			1.45	733	6.06	71.4	20.9	663 Turbid,			
14:03	1.1			0.64	703	6.06	93-	19.6	637			
14:06	2.2			0.61	704	6.05	101.9	19.6	628.			
14:09	3.5			0.58	695	6.05	99.5	19.6	623.			
14:12	4.5			0.53	686	6.06	95.4	19.6	615.			
14:15	6.5			0.52	691	6.06	89.9	19.5	607			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature: <u>Tim W</u>		Date: <u>1/12/17</u>						
Project Manager Signature		Date		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: D1 (Triangle)		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.71		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 6.54		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/st'ck up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
2:35	0		0.3/min	0.83	557	5.95	70.2	20.5	C 509		
2:38	1.2			0.41	559	5.77	10.6	20.4	510		
2:41	2.4			0.31	549	5.73	115.9	20.3	499.4		
2:44	3.5			0.26	538	5.73	121.2	20.4	488.7		
2:47	4.5			0.24	530	5.72	122.1	20.4	483.4		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T3E		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101155		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sec. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
15:10	0			1.02	849	6.04	-59.7	18.7	788. Clear, slight sulfur smell.		
15:13	1.2			0.30	985	5.95	-56.1	18.7	869		
15:16	2.3			0.23	1003	5.92	-46.7	18.7	882		
15:19	3.5			0.21	1000	5.92	-44.2	18.7	881		
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Ampac	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature: <u>TIM W</u>		Date: <u>1/12/17</u>					
Project Manager Signature		Date		Distribution: Project Central							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: Gw-73C-A		Sample Date: 1/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.91		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 3.65		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
3:31	1.0		0.3/min	2.15	888	5.61	-20.1	20.6	807 Clear, sulfur odour.		
3:34	2.0			0.38	873	5.31	-18.6	19.6	783		
3:37	3.0			0.28	870	5.30	-24.9	19.6	780		
3:40	4			0.25	870	5.29	-27.1	19.6	780		
3:43	5			0.23	875	5.26	-28.2	19.5	783		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BH12		Sample Date: 5/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 13.03		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 17.20		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 17.20m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time: Hydrasleeve in.	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole						Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mg/lcm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
8:36	0			8.56	307.8	7.61	48.0	24.7	306.5	Turbid & cloudy/sandy.	
8:39	0.8L			8.46	293.9	7.31	53.1	23.6	286.1		
8:43	1.8L			8.09	290.4	6.60	97.6	23.2	280.8	Cloudy & milky.	
8:46	2.2L			8.07	289.5	6.28	119.8	23.0	278.2		
8:49	2.6L			8.10	290.1	6.12	137.9	22.6	276.9		
8:52	3.2L			8.07	289.5	6.03	151.7	22.9	278.5		
8:55	3.8L			7.99	290.3	5.98	160.2	23.8	282.0		
8:58	4.1L			8.04	289.4	5.94	166.7	23.2	279.4		
9:01	4.6L			8.08	288.4	5.91	172.6	23.0	277.6		
9:04	5.2L			8.14	287.9	5.88	176.8	22.7	274.0		
9:07	5.8L			8.17	287.7	5.87	180.6	22.5	273.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: <u>GW-D8</u>		Sample Date: <u>5/12/17</u>									
Project Name: <u>Building Roe 8</u>	Project Number: <u>60478410</u>	PM Name: <u>Chris McGraghan</u>									
Client: <u>Main Roads</u>	Project Location: <u>Beelihar Wetlands</u>	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:						
Depth to GW (m-pvc): <u>10.21m</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc): <u>11.30m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved			Parameters						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
<u>10:25</u>	<u>0</u>		<u>0.2/min</u>	<u>4.88</u>	<u>827</u>	<u>6.72</u>	<u>-87.3</u>	<u>27.8</u>	<u>872</u>		<u>Clear</u>
<u>10:28</u>	<u>0.5</u>			<u>0.70</u>	<u>885</u>	<u>6.44</u>	<u>-109.9</u>	<u>23.1</u>	<u>843</u>		
<u>10:31</u>	<u>1</u>			<u>0.59</u>	<u>827</u>	<u>6.41</u>	<u>-110.0</u>	<u>22.9</u>	<u>842</u>		
<u>10:34</u>	<u>1.5</u>			<u>0.48</u>	<u>875</u>	<u>6.36</u>	<u>-108.8</u>	<u>22.8</u>	<u>838</u>		
<u>10:37</u>	<u>2</u>			<u>0.44</u>	<u>877</u>	<u>6.34</u>	<u>-108-</u>	<u>22.8</u>	<u>839</u>		
<u>10:40</u>	<u>2.5</u>			<u>0.41</u>	<u>877</u>	<u>6.33</u>	<u>-108.7</u>	<u>22.8</u>	<u>840</u>		
<u>10:43</u>	<u>3</u>			<u>0.39</u>	<u>877</u>	<u>6.31</u>	<u>-109.1</u>	<u>22.6</u>	<u>837</u>		
<u>10:46</u>											
<u>10:49</u>											
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>5/12/17</u>		Checker Name and Signature: <u>TIM W [Signature]</u>				Date: <u>5/12/17</u>			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-DS		Sample Date: 4/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.45m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 5.96m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
15:12	0			3.10	1130	6.38	-19.2	19.9	1011	Slight sulphur odour, mostly clear		
15:15	1.4L			0.38	1083	5.55	-16.7	18.9	956			
15:18	3L			0.25	1069	5.47	-16.1	18.9	944			
15:21	4L			0.21	1066	5.45	-15.9	19.0	943			
15:24	5L			0.21	1063	5.45	-15.7	19.0	941			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T48 T48		Sample Date: 4/12/17						
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101155		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 0.92 m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc): 2.12 m		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input checked="" type="checkbox"/> Retrieved						Sampling Start Time:		Parameters		
Key Type (if applicable):														
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):								
Water Quality Parameters														
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity				
13:38	0			4.00	455.6	3.62	-63.9	21.2	421.5	Slightly turbid.				
13:41	1.1			0.33	443	5.45	-79.1	19.7	397.7					
13:44	2.2			0.21	442.2	5.44	-85.7	19.6	396.8					
13:47	3.5			0.24	442.6	5.44	-90.6	19.6	396.6	Strong Sulfur Smell after ~3.8L				
13:50	4.6			0.21	441.3	5.44	-94.7	19.6	395.9					
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments						
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic						
Approval and Distribution														
Fieldwork Staff Signature		Date						4/12/17		Date				
Project Manager Signature		Date		Distribution: Project Central File										

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelior Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 4/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 5.51m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 10.85m		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/>		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Baler <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
15:59	0			2.05	527	5.92	-57.1	21.2	485.6			
16:02	0.6L			2.36	511	6.06	-45.9	21.8	482.8 Tube filled with sand.			
16:08	1.0L			1.70	524	6.16	-33.6	21.1	484.2			
16:11	1.8L			0.29	513	6.03	-36.7	20.7	470.7			
16:14	2.5L			0.21	512	6.01	-36.0	20.7	469.5			
16:17	3.3L			0.17	511	6.01	-36.3	20.6	467.7			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrus	x 60 mL mola's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: F52		Sample Date: 13/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Watera		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	10 cm			3.85	1334	7.28	-65.7	29.6	1541	564	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: A10		Sample Date: 13/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Walerra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity			
	15cm			2.14	1309	7.40	-43.3	32.8	2080	44.9		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: NLWS-N2		Sample Date: 13/12/17		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or uS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			4.76	1775	7.70	-47.5	26.1	C	NTH
	30cm			0.30	1776	7.52	-66.1	24.1	1874	19.9
									1742	20.8
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amper	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature		Date		
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

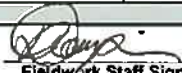
Q4AN(EV)-405-FM1

Surface Water:		<input checked="" type="checkbox"/> Groundwater:									
Bore / Location ID:		A1		Sample Date: 13/12/17							
Project Name:	Building Roe B	Project Number:	60478410	PM Name:	Chris McGraghan						
Client:	Main Roads	Project Location:	Beeliar Wetlands	Fieldwork Staff:							
General Bore Information			Parameter Info.	Decontamination	Sampling Method						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)							
	Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	1000	20cm		2.99	1786	7.51	-114.7	27.1	C	NTU 37.1	
										Too shallow to profile.	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: A1E		Sample Date: 13/12/17									
Project Name: Building Roc 8	Project Number: 60478410	PM Name: Chris McGraghan									
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve Info.						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101155	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out					
	Key Type (if applicable):	<input type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
	13cm			7.95	1778	7.77	-47.3	29.1	1917	78.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Farrow	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 13/12/17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>Surface Water:</td> <td><input type="checkbox"/></td> <td>Groundwater:</td> <td><input checked="" type="checkbox"/></td> </tr> <tr> <td>Bore / Location ID:</td> <td colspan="3">A25</td> </tr> <tr> <td>Sample Date:</td> <td colspan="3">13/12/17</td> </tr> </table>				Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>	Bore / Location ID:	A25			Sample Date:	13/12/17		
Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>												
Bore / Location ID:	A25														
Sample Date:	13/12/17														
Project Name:	Building Roe 8	Project Number:	80478410	PM Name:	Chris McGraghan										
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:											
Well Development or Well Sampling Event? (circle)															
General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve info.									
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:									
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:									
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve									
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra									
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)										
	Key Type (if applicable):		<input type="checkbox"/> Retrieved												
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):											
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity				
	16cm			16.50	1366	9.97	-42.4	26.4	1401	342.7					
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)						
Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments									
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic											
Approval and Distribution															
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature			Date						
Project Manager Signature		Date		Distribution: Project Central File											

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		<input type="checkbox"/>	
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: BLNS-31		Sample Date: 13/12/17		Well Development or Well Sampling Event? (circle)	
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	15cm			19.52	1477	9.97	-23	26.4	1516	21.1	
	40cm			19.35	1476	9.96	-21.5	26.4	1516	22	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)	WQA02		Bore volume calculation, bore condition, size of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>						
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: 42		Sample Date: 13/12/17						
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer		<input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):								
Water Quality Parameters														
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μS/cm)	pH	Redox (mV)	Temp °C	C NTU 1541 286.5					
	15cm			20.24	1468	10.20	-32.8	27.6						
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments						
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL, metals (HNO ₃)			Bore volume calculation, bore condition, false of tubing, redox correction etc.							
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic										
Approval and Distribution														
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File										

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: B2 Setty		Sample Date: 13/12/17			
General Bore Information					Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	(number in order):
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved							Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	15cm			21.32	1474	10.14	-25.2	26.6	C	NTU	
	35cm			21.05	1474	10.12	-23	26.5	1516	85.	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Farnous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		13/12/17		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

GW-08 15/15
 BH 12 20130

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FQM - Groundwater Sampling and Purging Record

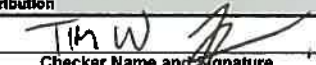
Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-08		Sample Date: 19/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.27m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Gauging	
Bore Depth (m-pvc): 11.88m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
04:03	0			2.29	727	6.51	-121.1	20.6	666	Slightly turbid	
04:06	1.1			1.90	725	6.43	-120.4	20.5	662	Sulfur smell.	
04:09	2.2			2.31	719	6.42	-119.7	20.4	657		
04:12	3.3			2.87	716	6.41	-115.5	20.5	654		
04:15	4.1			2.65	691	6.38	-113.9	20.4	630		
04:18	5.1			1.97	679	6.37	-115.5	20.3	618		
04:21	6			1.82	669	6.38	-116	20.3	610		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amper	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T4B		Sample Date: 19/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 0.945m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 2.125m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
10:45	0			1.15	446.3	5.60	-72.5	19.9	402.1	Sulfur odour		
10:48	1.5			0.24	428.3	5.46	-79.2	19.8	385.2	Slightly cloudy.		
10:51	3			0.20	427.6	5.44	-86.6	19.8	385.2			
10:54	4.5			0.18	427.4	5.44	-91	19.8	384.7			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature		Date		 Checker Name and Signature		19/12		Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: D2		Sample Date: 19/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.93		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.57		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Retrieved				Sampling Start Time:		Hydrasleeve out
Key Type (if applicable):												Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
9:04	0			2.16	689	6.56	109.0	19.7	C Slightly turbid, nit about.			
9:07	1.3			0.73	648	6.29	52.3	19.7	582			
9:10	3.2			0.64	653	6.26	67.7	19.7	584			
9:13	4.5			0.59	636	6.27	68	19.7	572			
9:16	5.8			0.53	648	6.25	59.3	19.7	585			
9:19				0.49	633	6.26	50.8	19.8	570			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature		Date: 19/12/17		Checker Name and Signature: Tim W		Date:						
Project Manager Signature		Date:		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: <u>GW-D4</u>		Sample Date: <u>19/12/17</u>							
Project Name: Building Roe B	Project Number: 6047B410	PM Name: Chris McGraghan							
Client: Main Roads	Project Location: Beellar Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)						
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve Info.				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <u>0.50m</u>	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): <u>3.91m</u>	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:21	0			1.63	189.2	6.04	91.3	21.3	C 179 - Clear to slightly turbid.
10:24	1.5			0.93	186.8	6.01	113 -	21.1	173.1
10:27	3			0.85	187.3	6.02	125.1	21.1	173.5
10:30	4.5			0.82	188.5	6.02	132.4	21.1	174 -
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Farcus	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T4C			
						Sample Date: 19/12/17			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		F1 Decontaminated			
Depth to GW (m-pvc): 5.55m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		F1 Dedicated			
Bore Depth (m-pvc): 10.865m		Casing Radius (mm):		Corrected Redox: Y / N		F1 Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		F1 Bailer F1 Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Peristaltic Pump F1 Waterra			
		Key Type (if applicable):		F1 Retrieved		F1 Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:05	0			1.85	520	6.02	-78.7	21.1	C 476 - Slightly turbid
11:08	1			0.54	513	6.00	-71.1	20.4	467.9
11:11	BLOCKAGE								
11:14	2			1.00	517	6.07	-66.5	20.9	478.3
11:17	3			0.36	515	6.01	-55	20.6	468.7
11:20	4			0.21	513	6.02	-53	20.2	466.6
11:23	5			0.23	513	6.02	-52.2	20.2	466.7
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: <u>BH12</u>		Sample Date: <u>19/12/17</u>							
Project Name: Building Roe 8	Project Number: 6047B410	PM Name: Chris McGraghan							
Client: Main Roads	Project Location: Beellar Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)						
General Bore Information		Parameter Info.	Decontamination						
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated						
Depth to GW (m-pvc): <u>13.12m</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated						
Bore Depth (m-pvc): <u>17.22</u>	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable						
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Other (specify)						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
15:04	0			8.74	285.1	6.15	103.2	24.9	282.0 Silty nil odour.
15:08	0 0.2L			8.92	275.7	5.75	143.5	23.6	268.8
15:12	1L			9.04	273.1	5.66	161.4	23.0	261.7
15:15	1.5L			8.77	211.6	5.58	174.2	22.3	257.8
15:19	2.0L			8.65	271.0	5.54	182.9	22.5	258.3
15:23	2.6L			8.61	260.5	5.53	190.3	22.5	255
15:27	3.0L			8.45	270.8	5.53	195.9	22.3	256.7
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrutis	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>19/12/17</u>		Checker Name and Signature: _____		Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: THC T3C		Sample Date: 20/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 0.235		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.135		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:25				3.90	427	5.98	-66.0	18.3	373		
8:28	1.5			0.34	357.3	5.49	-19.7	17.9	308.9		
8:31	2.5			0.24	355.5	5.43	-12.5	17.9	307.3		
8:34	3.5			0.20	355.1	5.42	-12.2	17.9	306.7		
8:37	4.5			0.19	344.4	5.42	-12.0	17.9	306.3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: TZE		Sample Date: 20/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 2.645		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.645		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 4.16		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:56				2.55	908	5.83	-49.8	18.8	799		
8:59	1			0.52	1008	5.93	-89.3	18.4	883		
9:02	2			0.33	1035	5.92	-81.4	18.5	907		
9:05	3			0.25	1032	5.93	-78.8	18.6	905		
9:08	4			0.22	1026	5.93	-77.7	18.6	901		
9:11	5			0.20	1023	5.94	-77.8	18.6	897		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-95		Sample Date: 29/12/17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.39		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 5.95		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9.22				2.70	1172	5.90	-6.3	20.2	1052		
9.25	2			0.37	1198	5.39	0.6	19.1	1062		
9.28	3			0.33	1150	5.46	-13.1	19.2	1022		
9.31	4			0.21	1138	5.47	-13.6	19.2	1013		
9.35	5.3			0.20	1166	5.44	-13.0	19.2	1038		
9.38	6			0.18	1155	5.43	-11.4	19.3	1030		
9.41	7			0.17	1167	5.42	-12.3	19.3	1041		
9.44	8			0.17	1165	5.43	-13.1	19.3	1037		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amper	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A		Sample Date: 20/12/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.99		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 3.62		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
9.53				1.79	823	5.50	-71.5	20.4	746			
9.56	1			0.40	800	5.38	-53.3	19.9	721			
9.59	2			0.29	796	5.38	-61.9	19.8	717			
10.02	3			0.26	790	5.37	-63.9	19.9	713			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Via' (HCl)		x 60 mL Ferrous		x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Via' (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roc 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff: TWJET		Bore / Location ID: 01				
						Sample Date: 27.12.17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 27.12.17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 2.80	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 6.54	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
6.36				1.53	4.78	6.00	-10.2	9.25	433	CLEAR, VERY SLIGHT SULFUR ODOUR
6.46	2L			0.38	4.76	5.67	-20.8	20	431	"
6.51	3.8L			0.28	4.70	5.65	-39.6	21.1	425	"
6.55	5.5L			0.23	4.55	5.60	-41.7	20.1	413	"
6.59	6.3L			0.22	4.62	5.61	-50.6	20.1	418	"
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 27.12.17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW & ET		Bore / Location ID: GND53		Sample Date: 27.12.17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 27.12.17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 4.09		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 7.12		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity		
0711				1.25	431	5.37	28.7	20.5	395	SLIGHTLY MILKY, ODOORLESS		
0714	1.2 L			0.36	416.5	5.24	37.4	20.4	380	"		
0719	3 L			0.24	395.7	5.26	55	20.5	360.0	"		
0722				0.23	386	5.30	57	20.6	353.3	"		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		27.12.17		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Boellar Wetlands		Fieldwork Staff: TW + ET		Bore / Location ID: GWD4		Sample Date: 27.12.17		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 27.12.17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 0.60	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 3.90	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DD (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
0731				3.75	258.7	5.73	55.8	20.5	235.5	
0734	1.3 L			2.78	252.1	5.68	82.0	20.4	230	ODORLESS
07.37				2.81	251.6	5.67	98.7	20.5	230.4	
				2.75	252.4	5.68	107	20.6	231.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TWJET		Bore / Location ID: GWP T3B				
						Sample Date: 27.12.17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 27.12.17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated <input checked="" type="checkbox"/> Low Flow; Pump rate:				
Depth to GW (m-pvc): 1.91		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated Intake depth:				
Bore Depth (m-pvc): 8.83		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable <input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)				
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		Hydrasleeve Install time:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
0752				1.52	150.9	5.87	-43.5	19.7	135.6	SLIGHT SULFUR ODOUR
0756	2 L			0.42	148.8	5.70	-60.2	20.0	134.5	
0758	2.5 L			0.25	149.4	5.70	-51.3	20.0	135.1	
0801				0.23	149.9	5.70	-47.2	20.0	135.6	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		27.12.17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: TW + ET		Bore / Location ID: G101 T3C		Sample Date: 27.12.17			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 27.12.17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 0.41		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 5.14		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):		
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
0813				1.50	399.9	5.47	-65.1	18.9	358.4 SULFUR ODOUR.		
0817				0.25	355.7	5.19	-37	17.8	306.9		
0820	3.5			0.27	354.3	5.14	-27	17.8	305.8		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature			Date			Checker Name and Signature			Date		
Project Manager Signature			Date			Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff: TW+ET		Bore / Location ID: BH10				
						Sample Date: 27.12.17				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level: 27.12.17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:				
Depth to GW (m-pvc): 1.78	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 5.64	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
0831				2.12	245.4	5.77	-57	20.3	223.8	HIGH TURBIDITY, DARK BROWN, SULFUR ODOR
0834	1.5 L			0.30	244.2	6.00	-102.6	21	225.4	"
0836	3 L			0.19	243.7	6.02	-112.6	21.2	225.9	CLEAR, BROWN, ODOURLESS
0839	4.2 L			0.17	242.2	6.02	-114.8	21.3	224.9	"
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff: TW + ET		Bore / Location ID: T2F		Sample Date: 27.12.17			
General Bore Information					Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 27.12.17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.74		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	Gauging
Bore Depth (m-pvc): 4.16		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump		<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Sampling Start Time:	Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Parameters	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved	Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
0853				1.77	991	5.76	-47.0	18.4	878	CLEAR, SULFUR ODOUR	
0856	1.2 L			0.69	1011	5.69	-53.6	18.5	884	"	
0858	2.5 L			0.47	990	5.70	-57.5	18.5	867	"	
0859	3 L			0.40	985	5.69	-58	18.5	863	"	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW-PET		Bore / Location ID: GW-TSE-A				
						Sample Date: 27.12.17				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level: 27.12.17		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 3.03		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 3.62		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
						<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
0907				1.32	777	5.49	-26.7	19.9	700	CLEAR, SLIGHT SULFUR ODOUR
0911				0.33	762	5.15	-43.7	19.7	686	CLEAR, SULFUR ODOUR
0914				0.24	761	5.13	-49.4	19.8	685	"
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

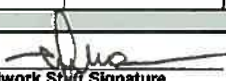
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: TW & ET		Bore / Location ID: GWD5					
						Sample Date: 27.12.17					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 27.12.17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.57	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		1		
Bore Depth (m-pvc): 5.97	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
0923				1.85	1228	5.22	5.0	20	1106 SLIGHT SULFUR ODOUR, CLEAR		
0927				0.31	1224	5.07	-4.0	19.2	1089 " "		
0931	3 L			0.23	1206	5.09	-9.6	19.2	1073		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 27.12.17		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: T4B		Sample Date: 27.12.17								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan								
Client: Main Roads	Project Location: Bealjar Wetlands	Fieldwork Staff: TW + ET	Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.					
Date of GW Level: 27-12-17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 0.985	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 2.09	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
1034				2.60	478	5.75	-98	21	434	SLIGHT SULFUR ODOUR, BROWN, MOD TURBIDITY
1037				0.35	422.6	5.27	-77.1	19.9	381.8	"
1041				0.25	421.9	5.24	-79.5	19.9	381.2	"
1043				0.22	422.6	5.23	-82.1	20.0	382	"
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 27.12.17		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: <i>CWD8</i>		Sample Date: <i>27.12.17</i>								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan								
Client: Main Roads	Project Location: Beellar Wetlands	Fieldwork Staff: <i>TW + ET</i>	Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: <i>27.12.17</i>	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <i>70.29</i>	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Bailer		<input checked="" type="checkbox"/> Hydrasleeve		Hydrasleeve Type:		
Bore Depth (m-pvc): <i>11.60</i>	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		<input checked="" type="checkbox"/> Waterra		Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)				Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)				Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate (L/min)	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
<i>1106</i>			<i>NTD</i>	<i>3.30</i>	<i>593</i>	<i>6.29</i>	<i>-98.5</i>	<i>26.5</i>	<i>610</i>	<i>STRONG SULFUR ODOUR, BROWN, CLEAR</i>
<i>1110</i>	<i>1.5L</i>			<i>2.13</i>	<i>585</i>	<i>6.35</i>	<i>-118</i>	<i>22.4</i>	<i>554</i>	<i>"</i>
<i>1113</i>	<i>2.2L</i>			<i>2.02</i>	<i>578</i>	<i>6.31</i>	<i>-116.3</i>	<i>22.2</i>	<i>546</i>	
				<i>2.17</i>	<i>576</i>	<i>6.29</i>	<i>-113.9</i>	<i>22.0</i>	<i>544</i>	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <i>[Signature]</i>		Date: <i>27.12.17</i>		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: A2		Sample Date: 27.12.17									
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)								
Client: Main Roads	Project Location: Beelihar Wetlands	Fieldwork Staff: TW + ET									
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Inlake depth:		Hydrasleeve Type:		Gauging			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Walerra	Hydrasleeve Install time:		Hydrasleeve out			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters			
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
11:34				7.05	1644	8.89	-45	25.3	1655	18.7	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>									
Bore / Location ID: BLWS/81		Sample Date: 27.12.17									
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan									
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff: TW + ET	Well Development or Well Sampling Event? (circle)								
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.						
Date of GW Level: 27.12.17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc):	Casing Radius (m.m):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	<input checked="" type="checkbox"/> Other (specify)	Hydrasleeve Install time:						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			Sampling Start Time:						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved			Hydrasleeve in Parameters						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU		Odour, Colour, Turbidity
11:43		15cm		8.04	1653	8.84	-9.8	25.9	1683	12.5	Brown/Red
11:44		45cm		8.80	1653	8.69	-83.0	25.9	1678	34.5	"
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 27		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Boaler Wetlands		Fieldwork Staff:		Bore / Location ID: BH12				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 28/12/17				
Depth to GW (m-pvc): 13.19		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)				
Bore Depth (m-pvc): 17.17		Casing Radius (mm):		Corrected Redox: Y / N		Monitoring sequence followed (number in order):				
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		Gauging				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole <input type="checkbox"/> Retrieved		Hydrasleeve info:				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve Size:				
						Hydrasleeve Type:				
						Intake depth:				
						Hydrasleeve Install time:				
						Hydrasleeve n				
						Parameters				
						Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
11-12	0			8.65	285.9	6.02	112.7	31.2	312	Yellow, turbid, cloudy.
11-15	0.3			8.63	273.6	5.58	132.4	29-	290.2	Flow stopped, changed battery on pump.
11-18	0.6			9.37	268.5	5.43	144.5	27.4	279.6	
11-21	1			9.21	266.5	5.39	150.1	26.8	276.4	
11-24	1.5			9.32	266.6	5.37	157.7	27-	275.8	
11-27	1.9			9.49	266.3	5.36	161.5	26.8	274.6	
11-30	2.2			9.10	265.2	5.33	163.7	27.3	269.4	
11-33	2.5			9.75	265.8	5.33	164.9	27.9	280.9	
11-36	2.8			9.74	264.9	5.34	168-	26.7	273.2	
11-39	3.1			10.30	264.7	5.34	168.8	27-	275.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-08		Sample Date: 16/01/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 10.33		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 10.77		Casing Radius (m.m):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in:
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out:
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC-E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU Odour, Colour, Turbidity			
7:39				2.50	442.9	6.77	-123.7	21.2	56.8 slightly turbid			
7:42				3.11	420.7	6.73	-120.2	20.4	43.2			
7:49				3.18	415.5	6.72	-115.8	20.4	24.6			
7:52				3.15	419.7	6.72	-114.7	20.4	20.6			
7:55				3.17	428.1	6.76	-111.2	20.4	18.4			
7:58	6.3 L			3.17	433.8	6.77	-109.2	20.6	18.3			
8:01				3.14	434.2	6.78	-108.6	20.8	16.9			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrous	x 80 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: BH12		Sample Date: 15/01/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 13.26		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 17.4		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/>		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity	
8:24				9.20	264.3	7.37	116.4	20.8	2000		
8:27				9.00	255.8	6.15	156.7	20.4	1750	very cloudy, milky	
8:30				9.00	246	5.84	173.3	19.8	1345		
8:33				9.00	237.2	5.70	183.2	19.6	880		
8:36				9.18	225.8	5.63	188.4	19.6	417.7		
8:39				9.13	220.7	5.59	191.5	19.6	266.6		
8:43				9.14	215.6	5.54	194.7	19.4	146.7		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

50M3

Surface Water:		<input checked="" type="checkbox"/> Groundwater:		<input type="checkbox"/>						
Bore / Location ID:		A2		11/1/18						
Project Name:	Building Roe B	Project Number:	60478410	PM Name:	Chris McGraghan					
Client:	Main Roads	Project Location:	Beeliar Wetlands	Fieldwork Staff:						
General Bore Information			Parameter Info.	Decontamination	Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Hydrasleeve					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump					
	Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Watera					
					<input type="checkbox"/> Other (specify)					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity
2:20				9.46	1965	8.56	23.1	26.1	30	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL P astic						
Approval and Distribution										
Fieldwork Staff Signature			Date		Checker Name and Signature			Date		
Project Manager Signature			Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

		Surface Water: <input checked="" type="checkbox"/>		Groundwater: <input type="checkbox"/>	
Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan	
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:	
				Bore / Location ID: A25	
				Sample Date: 11/11/18	
				Well Development or Well Sampling Event? (circle)	

General Bore Information		Parameter Info.		Decontamination	Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
	Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):				

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	
2.40				8.55	1968	8.51	24.7	26.2	16.6	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan	
Client: Main Roads		Project Location: Beelias Wetlands		Fieldwork Staff: LG SH RC	
Bore / Location ID:		Sample Date:		<input checked="" type="checkbox"/> Surface Water: <input checked="" type="checkbox"/> Groundwater:	
				BCL Setty 11/01/2018	
Well Development or Well Sampling Event? (circle)					
General Bore Information		Parameter Info.		Decontamination	
Sampling Method		Hydrasleeve info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:
Bore Depth (m-pvc)	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)			<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterera
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	<input type="checkbox"/> Hydrasleeve Instal time:
	Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Hydrasleeve out
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):
Water Quality Parameters					
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC-C (mBism or μS/cm)
pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
14:08	300m			9.28	1963
				48.45	33.5
				25.9°C	1998
					NTU 9.9
Acceptable Parameter Range: ± 10%, ± 3%, ± 0.05, ± 10 mV, ± 0.2 °C ± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:		Bottles Collected		QA/QC Information	
Field Comments		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	
Approval and Distribution					
Fieldwork Staff Signature	Date	Checker Name and Signature		Date	
		<i>[Signature]</i>		11/01/18	
Project Manager Signature	Date	Distribution: Project Central File			

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		<input type="checkbox"/>					
Bore / Location ID: RLNS - B1		Sample Date: 11/1/18							
Project Name: Building Rbe B	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)						
Client: Main Roads	Project Location: Beeliar Wetlands	Fieldwork Staff:							
General Bore Information		Parameter Info.		Decontamination	Sampling Method		Hydrasleeve info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		
	Key Type (if applicable):	<input type="checkbox"/> Retrieved					Hydrasleeve in Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU Odour, Colour, Turbidity
2.50				8.43	1972	8.67	30.4	26	20
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature			Date		Checker Name and Signature			Date	
Project Manager Signature			Date		Distribution: Project Central File				

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGratham		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 11/01/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 10.90		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve n
Depth to Product (m-pvc): 6		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity		
10:03				0.59	518	6.12	-46.2	21.2	67			
10:07				0.43	513	5.87	-31	21.3	51			
10:10				0.37	514	5.83	-22.2	21.4	140			
10:12				0.31	514	5.81	-13.3	21.6	50-90	→ NTU JUMPING		
10:15	25L			0.29	515	5.8	-11.6	21.5	60-170	→ NTU JUMPING		
10:18				0.27	513	5.79	-11.9	21.2				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Rpe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GWD5		Sample Date: 11/01/12				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.47		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.97		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Baller <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
11:03				0.72	1183	5.20	51.7	20.2	NTU 314 Sulfur smell, yellow			
11:09				0.33	1201	5.12	50.2	21.4	46			
11:13				0.33	1179	4.5.17	43.1	22.5	27.1			
11:16	2L			0.24	1168	5.20	36.4	20.9	03.6			
11:19				0.22	1167	5.23	33.5	20.8	92.7			
11:21				0.20	1165	5.24	31.1	20.9	170.1			
11:24	3.5L			0.20	1167	5.25	27.3	20.4	299.3			
11:27				0.19	1163	5.25	26.8	20.2	376.			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Padlock

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Bore / Location ID: D2		Sample Date: 11/01/18	
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)
Client: Main Roads	Project Location: Beelair Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 3.14	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.56	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity
11:54				1.19	774	5.98	122.8	20.4	82.4	murky water
11:57				1.12	768	6	132.9	20.4	73.6	
12:00				1.08	766	6	137.2	20.7	69.8	
12:03				1.08	762	5.99	137.1	20.7	67.3	
12:05				0.94	757	6	135.1	20.6	68.9	
12:08	5.56			0.88	747	6	133.8	20.7	73.6	
12:11				0.85	741	6	132.4	20.6	90.	

Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
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Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Bore / Location ID: GW D5		Sample Date: 11/01/18	
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)
Client: Main Roads	Project Location: Beelie Wetlands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging			
Bore Depth (m-pvc): 7.13	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in			
Depth to Product (m-pvc): 4.17	Cover Type (gastic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out				
Product Thickness (m): 2.96	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity
10.34				0.31	1206.0	5.20	129.5	21.7	43.1	clear, some odour
10.37				0.38	1008.8	5.18	138.0	21.7	95.0	← Jumping a lot.
10.40	1L			0.29	314.3	5.20	140.2	21.7	45.5	
10.43				0.28	388.7	5.22	138.5	21.7	58.1	
10.46	3L			0.27	382.7	5.25	138.1	21.5	94.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Roundabout
Cnr Farrington / Murdoch

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order): Gauging Hydrasleeve in Hydrasleeve out Parameters	
Depth to GW (m-pvc): 2.89		Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Hydrasleeve Type:		Hydrasleeve Type:			
Bore Depth (m-pvc): 6.52		Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:			
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:			
		Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity
12.27				0.84	451.9	5.86	63.0	20.7	97	
12.30				0.38	465.6	5.64	90.8	20.8	338...	Sulfur odour, clear
12.33	2L			0.30	439.8	5.59	98.2	20.9	102, 103	
12.36				0.25	427	5.54	106	20.8	116	
12.39				0.22	421.9	5.48	112.3	20.8	74	
12.43	5L			0.21	424.5	5.49	110.8	20.9	148	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Farcus	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature			Date		Checker Name and Signature			Date		
Project Manager Signature			Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Boeljar Wetlands		Fieldwork Staff:		Bore / Location ID: GWT3EA		Sample Date: 10/01/18					
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.18		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 3.59		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):			
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
2.41				0.91	1069	5.40	-28.2	20.5	128.4	Sulfur smell, Turbid			
2.44				0.49	1049	5.07	-25.3	20.5	44.1				
2.47				0.36	1065	4.98	-24.1	20.5	36.8	PH 4.98			
2.50				0.27	1038	4.95	-26.5	20.4	46.9				
2.53				0.25	1032	4.95	-28.0	20.4	47.8				
2.56				0.23	1028	4.95	-29.3	20.4	39				
				0.22	1026	4.94	-29.5	20.4	35.4				
										NTU Jumping still			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.						
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic									
Approval and Distribution													
Fieldwork Staff Signature		Date		Checker Name and Signature		Date							
Project Manager Signature		Date		Distribution: Project Central File									

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe B		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff:		Bore / Location ID: T2F			
						Sample Date: 10/01/18			
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Hydrasleeve Size:			
Depth to GW (m-pvc): 4.29		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Monitoring sequence followed (number in order):			
Bore Depth (m-pvc): 9.44		Casing Radius (mm):		Corrected Redox: Y / N		Hydrasleeve Type:			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		Sampling Depth (m-pvc): Gauging			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		Hydrasleeve Install time: Hydrasleeve in			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		Sampling Start Time: Hydrasleeve out			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2:05				1.05	1194	5.93	14.8	21.0	80.1
2:08				0.42	1266	5.41	-28.2	20.3	135.5 Sulphuric smell
2:11				0.37	1231	5.29	-25.4	20.1	180
2:14				0.33	1212	5.26	-22.8	20.2	120
2:17				0.30	1216	5.25	-21.8	20.3	99
2:22				0.26	1217	5.25	-20.1	20.6	87
2:24	4.5L			0.23	1217	5.25	-20.3	20.5	88
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrucous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (F ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 6047B410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: 73C 10/1118		Sample Date:				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 50cm		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 5.13		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Parameters
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity		
10:45				0.66	391	5.83	-50	19.5	40			
10:49				0.33	369.4	5.42	-18.1	19.3	31			
10:52				0.25	366.9	5.28	-3.2	19.2	28	sulphur odour		
10:55				0.20	366.1	5.21	5.7	19.2	24.7	and		
10:57				0.18	365.2	5.18	10.3	19.1	25.9	Turbidity.		
11:00				0.16	364.1	5.17	12.8	19	32.2			
11:03	8 L			0.15	363.2	5.16	14.4	19.1	41.1			
11:06				0.14	362.4	5.16	15.6	19	48.5			
11:09				0.13	361.7	5.16	16.4	19	57			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Via [®] (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. NTU jumping around.					
		x 40 mL Via (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

grass field core.

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GWD4		Sample Date: 10/11/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 0.68		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 3.89		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Hydrasleeve out
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity		
10:00				4	265.1	6.42	56.6	21.4	73.6			
10:05				3.04	259	5.84	100.9	21.3	72.3			
10:08				3.19	256.9	5.72	120.6	21.2	60.5			
10:11				3.18	255.4	5.70	128.1	21.3	53.			
10:14				3.08	258.7	5.68	133.7	21.2	51.2			
10:16	6L			2.96	259.1	5.68	137	21.2	51.3	Clear, odorless		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:		<input type="checkbox"/>		Groundwater:		<input checked="" type="checkbox"/>				
Bore / Location ID:		B410		Sample Date:		10/1/18				
Project Name:		Building Roe 8		Project Number:		60478410				
Client:		Main Roads		Project Location:		Beeliar Wetlands				
PM Name:		Chris McGraghan		Fieldwork Staff:						
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101155		<input checked="" type="checkbox"/> Decontaminated		Low Flow: Pump rate:		
Depth to GW (m-pvc): 1.85		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		
Bore Depth (m-pvc): 5.65		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved				Sampling Start Time:		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
9.28				0.61	301.4	6.11	-56.9	21.9	64.1	
9.31				0.22	300.3	6.02	-74.2	22.1	72.0	
9.38	0.36			0.15	300.1	6.02	-81.6	22.3	69.4	
9.36				0.13	299.1	6.02	-86.7	22.4	73.5	
9.39				0.12	297.7	6.01	-88.9	22.4	87.3	
9.41	1.5L			0.11	294.2	6.01	-90.3	22.4	91.7	
9.44				0.11	290.7	6.00	-90.9	22.4	94.2	
9.46				0.10	287.2	6.00	-91.1	22.5	95.0	
9.49	6.5L			0.10	285.4	6.00	-91.4	22.5	105.0	
				0.09	284.1	5.99	-91.3	22.7	113.1 - Jumping a lot	
									Yellow, odourless	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

First 2
SPE Readings
155.
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water:		<input type="checkbox"/>		Groundwater:		<input type="checkbox"/>				
Bore / Location ID:		T38		Sample Date:		10/01/17				
Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan	Well Development or Well Sampling Event? (circle)				
Client:	Main Roads	Project Location:	Beeliar Wetlands	Fieldwork Staff:						
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	1.97	Screen Interval (m):		<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	8.87	Casing Radius (mm):		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity
8:45				0.62	1455	6.08	-49	20.3	55.9	
8:50				0.28	1455	5.83	-62	20.2	68.5	
8:53				0.21	160.1	5.78	-55.2	20.3	60.4	
8:56				0.17	161.0	5.76	-50.6	20.3	59.4	
8:59	4.5			0.14	162.2	5.74	-43.6	20.3	62.4	
8:05				0.16	162.7	5.72	-37.5	20.4	25.5	
9:08				0.18	150	5.72	-34.7	20.1	23.0	
9:13	6L			0.13	163.2	5.72	-33.7	20.2	21.8	(Tube was on bottom, for few of previous readings). lifted higher for last reading.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	Samples taken x 6.		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T415		Sample Date: 10/01/17				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.04m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 2.10m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-ovc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	Odour, Colour, Turbidity		
7:53am				1.09	430.1	5.80	-203.0	20.3	163	(slight sulphuric odour) (Redox = -60.1) clearish.		
7:57				0.19	415.8	5.31	-41	20.3	74.3			
8:00				0.13	415.1	5.27	-45.3	20.2	60.			
8:03	4L			0.12	415	5.26	-49.6	20.3	46.			
8:08				0.11	415.3	5.26	-56.1	20.3	36.			
8:11	7L			0.11	415.3	5.26	-59.6	20.3	30			
8:14	8L			0.10	415.1	5.25	-61.7	20.3	31.5			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL meta's (HNO ₃)	Samples taken x6.		Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

						Surface Water: <input type="checkbox"/>	Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8						Bore / Location ID: BHD					
Project Number: 60478410						Sample Date: 24/1/18					
Client: Main Roads						Project Location: Beekar Wetlands					
PM Name: Chris McGrathen						Fieldwork Staff:					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17HT01156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 1.60	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging				
Bore Depth (m-pvc): 5.62	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
2:26	0			2.50	839.1	5.82	59.9	24.1	328.4	Tea coloured, slightly turbid	
2:30	1			0.65	349.8	5.83	82.7	22.8	335.4	slight sulfur odour	
2:33	2			0.64	351.4	5.84	88.5	23.1	338.5		
2:37	4			0.60	351.8	5.86	93.5	23.2	340		
Acceptable Parameter Range: ±10% DO, ±3% E.C., ±0.05 pH, ±10 mV Redox, ±0.2 °C Temp, ±10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, taste of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date	Checker Name and Signature		Date						
Project Manager Signature		Date	Distribution: Project Control File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T2F		Sample Date: 24/1/2018				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.67		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 4.16		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Parameters
Key Type (if applicable):				<input type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity		
12:08	0			1.42	969	5.63	-22	20.1	868	mostly clear, definitely sulfur odour		
12:12	2			0.49	882	5.83	-47.5	19.7	783			
12:16	3			0.34	873	5.83	-46.1	19.3	777			
12:20	5			0.27	873	5.83	-44.6	19.1	776			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: RC, JA		Bore / Location ID: T3B				
						Sample Date: 24/1/18				
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		F1 Decontaminated				
Depth to GW (m-pvc): 1.72		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		F1 Dedicated				
Bore Depth (m-pvc): 8.83		Casing Radius (mm):		Corrected Redox: Y / N		F1 Disposable				
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		F1 Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Peristaltic Pump F1 Waterra				
		Key Type (if applicable):		F1 Retrieved		F1 Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
1:59	0			3.70	181	5.58	-47.7	25.0	171	slightly cloudy / milky, no odor
2:02	1			0.44	170.7	5.79	-64.4	21.2	158.4	
2:05	2			0.36	179.6	5.78	-45.7	21.4	167.4	
2:08	3			0.30	181.7	5.77	-35.7	21.2	168.4	
2:11	4			0.27	182.7	5.76	-26.0	21.1	169.2	
2:14				0.24	183.2	5.76	-20.8	21.1	169.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: BCWA		Bore / Location ID: GW-05		Sample Date: 24/11/2018		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 2.50	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				Gauging
Bore Depth (m-pvc): 5.90	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				Hydrasleeve in
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:				Hydrasleeve out
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sampling Start Time:				Parameters	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
10:45	0			1.55	1137	5.60	13.3	24.5	1068	mostly clear, sulfur odor
10:48	1			0.34	1071	5.45	9.0	21.0	990	
11:51	2			0.27	1073	5.43	12.7	20.8	986	
11:54	3			0.23	1070	5.42	15.5	20.8	982	
11:57	4			0.22	1066	5.41	18.0	20.7	979	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff: RCWA		Bore / Location ID: GW-T3E-A		Sample Date: 24/1/2018			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.90		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 3.67		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved							Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
11:24	0			1.65	890	5.46	-5.1	23.8°C	823		mostly clear, slight sul/fer smell
11:27	2			0.32	848	5.10	-9.8	20.4°C	773		
11:30				0.27	843	5.04	-8.6	20.4°C	771		
11:33	4.3			0.25	846	5.04	-6.6	20.4°C	772		
Acceptable Parameter Range: ± 10% DO, ± 3% E.C., ± 0.05 pH, ± 10 mV Redox, ± 0.2 °C Temp, ± 10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410				PM Name: Chris McGraghan					
Client: Main Roads				Project Location: Beeliam Wetlands				Fieldwork Staff: RCJA					
Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: A2		Sample Date: 24/1/2018		Well Development or Well Sampling Event? (circle)					
General Bore Information				Parameter Info.				Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):						
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging						
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in						
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved											
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):									
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity		
10:26	150m			4.13	2286	7.37	36.1	25.9	2321	29.6			
10:28	300m			0.82	2306	7.06	-114.8	25.0	2295	67.9			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic									
Approval and Distribution													
Fieldwork Staff Signature		Date		Checker Name and Signature		Date							
Project Manager Signature		Date		Distribution: Project Central File									

FQM - Groundwater Sampling and Purging Record

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Bore / Location ID: BLNS-B1			
Client: Main Roads				Project Location: Beeliar Wetlands		Fieldwork Staff: RCJA		Sample Date: 24/1/18			
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out				
	Key Type (if applicable):			<input type="checkbox"/> Retrieved			Parameters				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	EC	NTU	Odour, Colour, Turbidity
9:54	20cm			6.36	1707	8.40	46.3	26.7°C	1761	3.5	
9:58	50cm			6.33	1707	8.41	46.9	26.4°C	1755	5.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. <i>ADN</i>			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date	Checker Name and Signature		24/1/18		Date				
Project Manager Signature		Date	Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>	<input checked="" type="checkbox"/> Groundwater:	<input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: RCJA		Bore / Location ID: A1N					
						Sample Date: 24/1/2018					
						Well Development or Well Sampling Event? (circle)					
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
10:09				6.50	1823	7.10	-15.3	29.2°C	1976	75.6	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date	Checker Name and Signature			24/1/16		Date			
Project Manager Signature		Date	Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

				Surface Water: <input type="checkbox"/>		<input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>					
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan					
Client: Main Roads		Project Location: Beeliear Wetlands		Fieldwork Staff: RC, JA		Sample Date: 24/1/2018					
				Well Development or Well Sampling Event? (circle)							
General Bore Information			Parameter Info		Decontamination	Sampling Method		Hydrasleeve Info			
Date of GW Level:		Bore Radius (mm):	Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):		Screen Interval (m):	Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):		Casing Radius (mm):	Corrected Redox: Y / N		<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out		
		Key Type (if applicable):	<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
10:13	150m			6.45	1800	7.53	-9.0	26.8°C	1862	50.6	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Commets		
Field Filtered:		Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution											
Fieldwork Staff Signature			Date	Checker Name and Signature			24/1/13			/Date	
Project Manager Signature			Date	Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: RC, JA		Bore / Location ID: A25		Sample Date: 24/1/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity	
9:51	15cm			6.59	1706	8.35	44.4	26.7°	1758	5.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analyses Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: RC, KB, JA		Bore / Location ID: BL Jetty		Sample Date: 24/1/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSi Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved					Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
9:25	20cm		-	7.16	1697	8.41	79.1	26.4°C	1741	4.1	
9:29	40cm		-	6.86	1695	8.48	72.5	26.2°C	1733	26.6	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		24/1/18		Date			
Project Manager Signature		Date		Distribution: Project Central File							

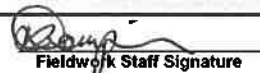
FQM - Groundwater Sampling and Purging Record

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Bore / Location ID: A2		Sample Date: 24/1/18			
Client: Main Roads		Project Location: Beeliar Wellands		Fieldwork Staff: RC, KB, JA		Well Development or Well Sampling Event? (circle)					
General Bore Information			Parameter Info.		Decontamination		Sampling Method			Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
9:34	15cm		-	8.58	1700	8.65	63	27.2°C	1772	10.1	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature _____		Date _____		Checker Name and Signature _____		Date 24/1/18					
Project Manager Signature _____		Date _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beefer Wellands		Fieldwork Staff:		Bore / Location ID: T3C			
						Sample Date: 25/01/18			
						Well Development or Well Sampling Event? (circle)			
General Bore Information		Parameter Info.		Decontamination		Sampling Method			
Date of GW Level: 25/01/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc): 0.16m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.14m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			
Depth to Product (m-pvc):	Cover Type (gatic/slick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump		<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):				
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:03	0			2.70	100.1	4.88	27.0	19.3	C 410
11:06	1.2L			0.38	403.0	5.28	18.4	19.3	359.7
11:09	2.4L			0.29	411.5	5.27	25.0	19.3	366.7
11:11	2.6L			0.25	404.0	5.27	28.1	19.1	357.6
11:14	4.8L			0.23	394.1	5.26	31.9	19.1	349.5
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature: 		Date: 25/01/18		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan				
Client: Main Roads				Project Location: Beelair Wetlands		Bore / Location ID: T413				
				Fieldwork Staff:		Sample Date: 25/01/18				
				Well Development or Well Sampling Event? (circle)						
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 25/01/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		
Depth to GW (m-pvc): 0.85m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		
Bore Depth (m-pvc): 2.08m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Baiter <input type="checkbox"/> Hydrasleeve		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved				Sampling Start Time:		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:32	0L			2.53	426	5.73	-52.3	22.5	402	
10:35	1L			0.42	415.1	5.35	-44.3	21.2	384.7	
10:38	2L			0.31	414.1	5.31	-45.6	21.1	383.6	
10:41	3L			0.26	413.7	5.30	-47.9	21.2	383.7	
10:44	4L			0.24	413.6	5.29	-50.4	21.2	383.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D4		Sample Date: 25/01/18					
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 25/01/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 0.47m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 3.90m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):			
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C				Odour, Colour, Turbidity
10:03	0			2.57	251	5.96	107.9	22.8					240
10:06	1L			1.93	264.7	5.89	123.1	22.4					251.5
10:09	2L			2.36	261.3	5.86	136.6	22.2					247.7
10:12	3L			2.54	259.4	5.85	140.6	22.2					246.3
10:15	4L			2.79	256.6	5.83	145.1	22.3					243.6
10:18	5L			2.80	255.8	5.84	145.6	22.3					242.9
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C					± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic									
Approval and Distribution													
Fieldwork Staff Signature: 		Date: 25/01/18		Checker Name and Signature: _____				Date: _____					
Project Manager Signature: _____		Date: _____		Distribution: Project Central File									

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FQM - Groundwater Sampling and Purging Record

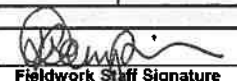
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Welllands		Fieldwork Staff: RC KB		Bore / Location ID: GW-03		Sample Date: 25/01/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 25/01/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 3.99m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 7.11m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR-CO. (microsiemen or µS/cm)	pH	Redox (mV)	Temp °C	C			
09:20	0L			7.69	400.1	5.63	126.0	23.9	384.4	mostly clear, nil odour		
09:23	1L			0.50	383.7	5.31	138.4	22.1	362.0			
09:26	2L			0.36	377.1	5.34	137.0	22.0	355.5			
09:29	3L			0.33	372.3	5.36	135.5	22.1	351.9			
09:32	4L			0.31	366.3	5.42	129.0	22.1	346.1			
09:35	5L			0.29	360.9	5.46	124.8	22.1	340.4			
09:38	6L			0.29	355.8	5.49	119.6	22.1	336.4			
09:40	7L			0.28	341.3	5.54	116.4	22.1	322.7			
09:43	8L			0.29	351.1	5.55	116.0	22.1	331.6			
09:46	9L			0.29	351.8	5.56	115.8	22.1	332.4			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		25/01/18		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff: RC KB		Bore / Location ID: D2					
						Sample Date: 25/01/18					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level: 25/01/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:					
Depth to GW (m-pvc): 1.86	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc): 5.56	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SCOR (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
08:16	0			4.32	806	6.18	115.1	21.8	752	Slightly turbid.	
08:19	2L			1.26	808	6.05	123.4	20.6	740		
08:22	3L			0.94	792	6.05	124.3	20.6	726		
08:25	4L			0.89	779	6.05	120.3	20.6	713		
08:28	5L			0.85	768	6.05	118.8	20.7	705		
08:31	6L			0.83	765	6.08	118.6	20.6	701		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature: 		Date: 25/01/18		Checker Name and Signature: _____			Date: _____				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: RC KB		Bore / Location ID: D1			
						Sample Date: 25/01/18			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level: 25/01/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		F1 Decontaminated			
Depth to GW (m-pvc): 2.63m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		F1 Dedicated			
Bore Depth (m-pvc): 6.52m		Casing Radius (mm):		Corrected Redox: Y / N		F1 Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) F1 Other (specify)		F1 Bailer F1 Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Downhole		F1 Peristaltic Pump F1 Waterra			
		Key Type (if applicable):		F1 Retrieved		F1 Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP.E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
08:44	0L			3.07	507	6.41	1.8	22.5	477.6 mostly clear, sulphur odour.
08:47	1L			0.46	513	5.72	58.6	21.0	473.1
08:50	2L			0.33	504	5.59	76.2	20.9	463.9
08:53	3L			0.27	495.5	5.52	85.7	20.9	456.6
08:56	4L			0.24	499.5	5.53	82.7	20.9	459.7
08:59	5L			0.22	498.5	5.52	66.8	20.9	459.2
08:52	6L			0.21	496.4	5.52	61.0	20.9	457.7
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record


Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BH12		Sample Date: 29/01/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 13.11		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 17.52		Casing Radius (mm):		Corrected Redox: Y / (N)		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Hydrasleeve Type:	
Depth to Product (m-avc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Watera		Sampling Depth (m-pvc):		Gauging	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved				Sampling Start Time:		Hydrasleeve out	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or μS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:08	0			9.40	274.3	7.01	11.4	25.1	C 273.2 Cloudy yellow, silty		
10:11	1.5L			8.90	262.6	5.86	116.9	22.6	251.1		
10:14	2.5L			8.85	260.6	5.61	149.9	22.6	248.4		
10:17	3.5L			8.83	259.2	5.47	167.5	22.4	246.3		
10:20	4.5L			8.83	258.6	5.41	175.9	22.4	246.1		
10:23	5.5L			8.85	257.2	5.38	184.8	22.4	245.3		
10:26	7.0L			8.84	255.7	5.36	190.1	22.3	242.3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Via ¹ (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL V.a (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: T4C		Sample Date: 29/01/18								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)							
Client: Main Roads	Project Location: Beelihar Wetlands	Fieldwork Staff: RC KR								
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve Info.					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
8:52	0			2.16	534	6.74	-82.8	22.2	301	Mostly clear, slight sulphur odour.
8:55	1L			0.53	513	6.01	-50.2	20.9	472.5	
8:58	2L			0.38	511	5.94	-39.6	20.9	471.0	
9:01	3L			0.35	510	5.92	-38.4	20.8	469.3	
9:04				0.32	510	5.91	-37.0	20.7	468.7	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. Taking blocking well, unable to dip, but could still sample				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
 Fieldwork Staff Signature		29/1/18 Date		_____ Checker Name and Signature		_____ Date				
_____ Project Manager Signature		_____ Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: <i>GW-D8</i>		Sample Date: <i>29/01/18</i>							
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGrathian							
Client: Main Roads	Project Location: Beellar Wellands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)						
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve info.				
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: <i>17H101156</i>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <i>10.26</i>	Screen Interval (m):	Chem Kit Model: <i>YSI Pro DSS</i>	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): <i>11.97</i>	Casing Radius (mm):	Corrected Redox: <i>Y / N</i>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
<i>9:22</i>	<i>0L</i>			<i>7.13</i>	<i>480.7</i>	<i>7.04</i>	<i>-98.4</i>	<i>23.3</i>	<i>457.0 strong sulphur odour</i>
<i>9:25</i>				<i>7.57</i>	<i>466.9</i>	<i>6.91</i>	<i>-94.3</i>	<i>21.1</i>	<i>425.4</i>
<i>9:29</i>	<i>3L</i>			<i>8.38</i>	<i>475.2</i>	<i>7.03</i>	<i>-88.2</i>	<i>21.02</i>	<i>438.7</i>
<i>9:32</i>	<i>3.5L</i>			<i>8.44</i>	<i>473.1</i>	<i>7.32</i>	<i>-83.7</i>	<i>21.4</i>	<i>441.5</i>
<i>9:35</i>	<i>4.0L</i>			<i>8.70</i>	<i>485.6</i>	<i>7.34</i>	<i>-81.6</i>	<i>21.6</i>	<i>455.0</i>
<i>9:38</i>	<i>4.5L</i>			<i>8.82</i>	<i>472.6</i>	<i>7.34</i>	<i>-77.9</i>	<i>21.6</i>	<i>442.0</i>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			<i>Plenty of air coming up through the tubing -</i>		
Approval and Distribution									
Fieldwork Staff Signature: <i>[Signature]</i>		Date: <i>29/01/18</i>		Checker Name and Signature			Date		
Project Manager Signature		Date		Distribution: Project Central File					

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-DS		Sample Date: 6/2/13		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 2.61	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.92	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
3.44				1.14	1093	5.76	-36.1	21.3	1011	
3.47				0.39	1089	5.49	-23.4	21.4	1014	
3.50				0.30	1091	5.46	-22.6	21.3	1015	
3.53				0.25	1090	5.45	-20.9	21.3	1013	
3.56	3L			0.22	1090	5.45	-21.3	21.3	1013	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

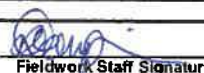
ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrathan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff: LG RC		Bore / Location ID: GW-T3E-A		Sample Date: 6/2/2016		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.02m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): 3.57m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC-EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:43	0			2.02	890	5.12	-9.7	22.3	C 834	
2.51				0.70	885	5.00	-22.8	20.8	809	
2.54	1.5			0.43	874	4.98	-28.0	20.8	803	
2.57				0.35	861	5.00	-32.6	20.7	790	
3.00	3			0.31	861	5.00	-34.7	20.7	790	
3.03				0.27	872	4.97	-38.8	20.7	801	
3.06				0.25	924	4.91	-34.7	20.8	853	
3.09	5			0.24	950	4.85	-33.3	20.7	872	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA 01 Duplicate.		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beekear Wetlands		Fieldwork Staff:		Bore / Location ID: A1N		Sample Date: 7/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info		Decontamination		Sampling Method		Hydrasleeve info	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPEC. (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:07	20m			9.26	253.2	7.25	-12.7	28.61	2536.8	NTU 282.8
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic				
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 7/2/18		Checker Name and Signature: _____				Date: _____		
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Bore / Location ID: 125		
Client: Main Roads				Project Location: Beelar Wetlands		Fieldwork Staff:		Sample Date: 8/2/2018		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Hydrasleeve Type:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP (mV or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
12:19	15cm			11.27	1962	8.99	-2.3	24.0	C	NTU 15.31
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		8/2/18		Date		Checker Name and Signature		Date		
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>
Bore / Location ID:	R- Jetty		
Sample Date:	8/2/18		


Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan
Client:	Main Roads	Project Location:	Beelar Wellands	Fieldwork Staff:	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101158	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve		Hydrasleeve Type:	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra		Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Other (specify)			Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)			Sampling Start Time:	Hydrasleeve out
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved					Parameters
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:	Total purged volume (L):					

Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	ORP E-O. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	NTU	Odour, Colour, Turbidity
11:49	15cm			11.19	1947	8.96	37	24.5	1931	9.5	
11:51	30cm			11.10	1938	8.96	35.5	24.3	1912	10.5	

Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL, metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
	8/2/18		
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

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FQM - Groundwater Sampling and Purging Record

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				Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>					
Project Name: Bulking Roe 8				Project Number: 60478410		PM Name: Chris McGraghan					
Client: Man Roads				Project Location: Beekar Wetlands		Fieldwork Staff:					
				Bore / Location ID: A2		Sample Date: 8/2/18					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
	Key Type (if applicable):							Parameters			
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
11:38	15cm			11.56	1946.6	9	31.5	24.9	C	NTU	1943 15.27
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature:		Date: 8/2/18		Checker Name and Signature: _____				Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: G2-D4		Sample Date: 9/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 0.60m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				Gauging
Bore Depth (m-pvc): 3.89m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):				Hydrasleeve in
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:				Hydrasleeve out
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:				Parameters
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPCEC (mg/l or µS/cm)	pH	Redox (mV)	Temp °C	Odeur, Colour, Turbidity	
11:57	0L			4.84	240.0	7.53	54.9	22.2	C	
12:00	1L			3.96	228.1	6.23	115.5	21.7	213.8	
12:03	2L			3.46	224.4	5.85	142.1	21.8	210.7	
12:06	3.2L			3.29	222.2	5.81	148.4	21.8	208.7	
12:09	5.5L			3.09	218.2	5.82	149.5	21.8	204.8	
12:12	6.5L			2.91	219.5	5.83	149.3	21.8	206.2	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, size of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 9/2/18		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: BHR		Sample Date: 9/2/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 13.17 m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 17.40 m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SP E.C. (mohm/cm or µS/cm)	pH	Redox (mV)	Temp °C	C			Odour, Colour, Turbidity
11:00	0			9.55	278.7	7.05	66.7	26.3	284.1			Cloudy yellow
11:03	0.8L			9.11	277.7	6.02	126.7	23.6	241.0			
11:06	1.8L			9.10	227.0	5.74	150.1	23.4	218.2			
11:09	2.4L			9.12	2214.6	5.58	165.3	23.2	207.3			
11:12	3.0L			9.11	212.3	5.52	169.4	23.0	204.2			mottly clear, slightly milky
11:15	3.5L			9.10	209.8	5.46	173.9	23.1	202.4			
11:18	4.2L			9.07	207.6	5.41	179.0	23.2	200.6			
11:21	5.0L			9.07	205.5	5.38	184.0	23.0	197.8			
11:24	5.8L			9.08	204.9	5.37	187.1	23.1	197.5			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wellands		Fieldwork Staff:		Bore / Location ID: GW-D3		Sample Date: 9/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 4.07m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc): 7.10m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:		Hydrasleeve in		Parameters	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC-EC (mg/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
10:14				1.24	442.0	6.40	24.9	22.3	418.1	Mostly clear nil odour.
10:17	1.5L			0.40	407.2	5.43	81.4	22.1	383.6	
10:20	2.5L			0.33	392.7	5.39	97.9	22.1	371.1	
10:24	4.0L			0.34	378.3	5.41	108.4	22.1	357.3	
10:27	5.0L			0.35	371.9	5.44	110.2	22.2	351.4	
10:30	6.0L			0.33	363.5	5.46	109.4	22.2	343.9	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		9/2/18 Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8		Project Number: 50478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D8		Sample Date: 12/2/2018		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 12/2/2018	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.297	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 11.834	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole					Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
08:18	0			6.94	530	6.89	-101.4	21.9	526	Strong sulphur odour, slightly milky
08:21	1L			1.40	544	6.60	-102.9	21.3	506	
08:24	2L			0.76	536	6.47	-104.1	21.1	495.9	
08:27	3L			0.55	529	6.41	-100.7	21.1	489.1	
08:30	4L			0.47	527	6.39	-97.5	21.1	487.8	
08:33	5L			0.44	532	6.38	-95.9	21.1	491.4	
08:36	6L			0.42	553	6.38	-95.6	21.1	493.6	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 12/2/18		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: D1		Sample Date: 13/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 2.823	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): 6.526	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent):	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR E.G. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
7:12	0			3.11	535	7.66	-24.6	20.9	293.5	Slight sulphur odour, mostly clear
7:15	1L			1.63	535	6.10	-12.6	21.0	494.3	
7:18	2L			1.48	517	5.79	-1.9	21.0	477.0	
7:21	3L			1.42	517	5.74	-11.8	21.0	477.6	
7:24	4L			1.37	508	5.73	-20.5	21.1	469.1	
7:27	5L			1.22	503	5.72	-26.4	21.0	465.5	
7:30	6L			1.11	514	5.72	-26.9	21.1	475.3	
7:33	7L			1.03	498.3	5.70	-26.5	21.0	460.7	
7:36	8L			0.93	505	5.69	-27.4	21.1	467.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 13/2/18		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Man Roads		Project Location: Beekar Wetlands		Fieldwork Staff:		Bore / Location ID: T3B		Sample Date: 13/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 1.884	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc): 3.445	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
08:09	0			2.41	185.2	6.28	-70.9	20.4	166.6	sulphur odour, mostly clear
08:12	1L			0.43	199.4	5.81	-51.8	20.2	181.7	
08:15	2L			0.33	211.4	5.78	-39.3	20.2	192.2	
08:18	3L			0.27	214.6	5.77	-28.7	20.2	195.1	
08:21	4L			0.25	215.1	5.77	-25.6	20.2	195.5	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 50 mL Ferrous	x 50 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date: 13/2/18		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: E0478410		PH Name: Chris McGraghen		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelar Wellands		Fieldwork Staff:		Bore / Location ID: T3C		Sample Date: 13/2/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):				
Depth to GW (m-pvc): 0.261m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				Gauging	
Bore Depth (m-pvc): 5.14m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve Install time:		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Start Time:		Sampling Start Time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:				Parameters	
Key Type (if applicable):											
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
08:38	0L			7.72	767	5.80	-40.7	19.4	682		
08:41	1L			0.95	437.0	5.37	-11.3	18.7	384.3		
08:44	2L			0.60	429.8	5.30	-3.9	18.8	379.0		
08:47	3L			0.53	439.1	5.28	-2.9	18.9	387.9		
08:50	4L			0.45	439.9	5.27	-2.8	18.9	388.5		
08:53	5L			0.40	437.3	5.27	-2.7	18.9	386.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		13/2/18		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: B110		Sample Date: 13/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17M101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.782m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.653m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Baller <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent):	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR EC- (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
09:08	0L			2.07	354.1	5.81	-22.7	22.0	332.1	Strong sulphur odour, tea coloured
09:11	1L			0.34	344.3	6.19	-85.1	22.4	327.3	
09:14	2L			0.27	343.1	6.21	-91.3	22.6	327.7	
09:17	3L			0.24	340.0	6.21	-94.1	22.7	324.9	
09:20	4L			0.23	339.8	6.20	-94.4	22.7	323.7	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 13/2/18		Checker Name and Signature:			Date:			
Project Manager Signature:		Date:		Distribution: Project Central File						

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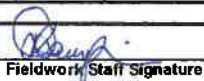
Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Man Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: T46 B		Sample Date: 13/2/18		
Well Development or Wall Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Intake depth:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 0.961m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated				Hydrasleeve Type:			
Bore Depth (m-pvc): 2.084m	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)			Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
10:50	0			2.04	448.3	6.41	-125.6	22.3	422.9	Strong sulphur odour
10:33	1L			0.42	414.0	5.57	-73.7	21.0	382.5	
10:36	2L			0.31	412.6	5.44	-61.4	21.0	380.9	
10:39	3L			0.27	412.0	5.39	-59.2	20.9	380.0	
10:42	4L			0.24	411.5	5.36	-58.2	20.9	379.4	
10:45	5L			0.23	411.3	5.35	-58.6	20.9	379.2	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		13/2/18		Date		Checker Name and Signature		Date		
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelker Wellands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 13/2/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 13/2/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SR-EC (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
10:58	0L			2.00	522	5.71	-40.7	23.2	500	
11:01	1L			0.45	517	5.86	-44.2	21.2	478.6	
11:04	2L			0.33	516	5.88	-40.1	21.1	477.6	
11:07	3L			0.27	515	5.90	-37.0	21.1	477.4	
11:10	4L			0.22	515	5.89	-34.8	21.1	476.6	
11:13	5L			0.22	515	5.89	-34.0	21.1	476.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				Unable to get dipper down bore due to blockage. Able to still sample though.		
Approval and Distribution										
Fieldwork Staff Signature: 		Date: 13/2/18		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelkar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>D2</u>		Sample Date: <u>13/2/18</u>		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: <u>13/2/18</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>2.094m</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): <u>5.57m</u>	Casing Radius (mm):	Corrected Redox: <u>Y / N</u>	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L):					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odeur, Colour, Turbidity	
11:29	0L			2.33	613	6.03	55.2	23.8	910	Slight sulphur odour, slightly turbid.
11:32	1L			0.42	625	6.06	75.1	21.5	584	
11:35	2L			0.30	631	6.04	78.0	21.5	588	
11:38	3L			0.25	628	6.07	76.3	21.4	586	
11:41	4L			0.23	613	6.07	72.4	21.6	571	
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>13/2/18</u>		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>GW-08</u>		Sample Date: <u>23/02/2018</u>			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): <u>10.34</u>		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): <u>11.79</u>		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
9.22	0			5.96	570	6.88	-103.0	23.6	548		
9.26				1.01	517	6.45	-110.5	21.2	478.8		
9.29				0.66	510	6.40	-106.8	21.1	469.9		
9.32				0.54	484.7	6.33	-102.3	21.1	444.5		
9.36				0.52	474.9	6.32	-98.4	21.2	490.0		
9.39	5			0.49	475.0	6.32	-97.5	21.2	441.2		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: D1		Sample Date: 23/02/2018			
General Bore Information			Parameter Info		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.92		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 6.54		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
8:43	0			1.48	527	6.02	39.8	21.7	493.2		
8:46				0.45	517	5.62	68.8	21.5	487.2		
8:49				0.34	517	5.60	78.2	21.5	481.9		
8:53	3			0.30	512	5.60	75.0	21.5	476.8		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: D2		Sample Date: 23/02/2018			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.71		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.37		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		
8:21	0			2.89	498.9	5.99	105.3	21.2	459.5		
8:24				0.59	493.1	6.07	97.3	20.9	451.2		
8:27				0.41	510	6.06	86.0	20.9	465.5		
8:30	3			0.33	508	6.06	80.0	21.0	469.3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				23/2/18 Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan				
Client: Main Roads				Project Location: Beelair Wellands		Fieldwork Staff:				
Bore / Location ID: G4-D4				Sample Date: 23-2-2018						
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 0.68	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 3.90	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
7:56	0			4.37	253.9	6.09	127.4	22.1	242.8	
7:59				4.11	252.7	5.91	149.5	22.0	237.2	
8:01				4.07	255.5	5.89	160.1	22.0	241.4	
8:04	4.2			4.07	254.5	5.89	163.7	22.0	242.5	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date	Checker Name and Signature		23/2/18		Date			
Project Manager Signature		Date	Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

						Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Project Name: Building Roe 8						Project Number: 60478410		PM Name: Chris McGraghan		
Client: Main Roads						Project Location: Beeliar Wetlands		Fieldwork Staff:		
Sample Date: 23/2/2018						Well Development or Well Sampling Event? (circle)				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve In	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
Key Type (if applicable):										
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity	
	20.0m			8.05	2225	8.78	-2.0	24.6	2208	9.8
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				Too shallow to profile.		
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads				Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A2		Sample Date: 23/2/2018		
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Parameters		
Calculated bore volume (L):				Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC ETC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C OTC			Odour, Colour, Turbidity
	20cm			8.53	2225	8.87	4.6	25.3	2224	NTU		8.6
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)												
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic				
Approval and Distribution												
Fieldwork Staff Signature			23/2/18 Date			Checker Name and Signature			Date			
Project Manager Signature			Date			Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

					Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>									
Project Name:					Building Roe 8		Project Number:		60478410		PM Name:		Chris McGraghan				
Client:					Main Roads		Project Location:		Beekar Wetlands		Fieldwork Staff:		Sample Date:		23/02/2018		
General Bore Information					Parameter Info.			Decontamination		Sampling Method			Hydrasleeve Info.				
Date of GW Level:					Bore Radius (mm):			Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated <input type="checkbox"/> Low Flow: Pump rate:			Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):					Screen Interval (m):			Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated Intake depth:			Hydrasleeve Type:		Gauging		
Bore Depth (m-pvc):					Casing Radius (mm):			Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable <input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):					Cover Type (galic/stick up):			(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		
Product Thickness (m):					Bore Locked (YES/NO):			Parameter method: <input checked="" type="checkbox"/> Downhole					Sampling Start Time:		Hydrasleeve out		
					Key Type (if applicable):			<input type="checkbox"/> Retrieved							Parameters		
Calculated bore volume (L):					Includes/ excludes bore annulus (circle)			# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters																	
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or μ S/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity								
	20cm			8.80	222.7	8.93	15.5	25.2	C	NTU	2834 8.6						
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)					
Analytes Sampled for:			Bottles Collected					QA/QC Information		Field Comments							
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.							
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic									
Approval and Distribution																	
Fieldwork Staff Signature					Date					Checker Name and Signature					Date		
Project Manager Signature					Date					Distribution: Project Central File							


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FQM - Groundwater Sampling and Purging Record

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Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BLWS-81		Sample Date: 23/2/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Parameters				
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	30cm			8.71	2227	8.92	-11.6	25.2	2234	10.1	
	50cm			0.33	2080	8.26	-190.1	24.6	2065	17	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

<input checked="" type="checkbox"/> Surface Water: <input checked="" type="checkbox"/> Groundwater:		Bore / Location ID: A/E								
Project Name: Building Roe 8	Project Number: 80478410	PM Name: Chris McGraghan	Sample Date: 23/2/18							
Client: Main Roads	Project Location: Beellar Wetlands	Fieldwork Staff:	Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.	Decontamination	Sampling Method	Hydrasleeve Info.					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):				
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Parameters				
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):						
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
	15cm			4.4	2879	7.76	-129.5	27.5	3069	NTU 12.9
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. <i>Too shallow to profile</i>		
		x 40 mL Vial (I ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
 Fieldwork Staff Signature		23/2/18 Date		_____ Checker Name and Signature			_____ Date			
_____ Project Manager Signature		_____ Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelir Wetlands		Fieldwork Staff:		Bore / Location ID: <u>OLWS-N2</u>		Sample Date: <u>23/2/18</u>				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C			
	<u>20cm</u>			<u>0.63</u>	<u>3653</u>	<u>6.98</u>	<u>-47.9</u>	<u>22.9</u>	<u>3498</u>	<u>NTU</u>	<u>136</u>	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. <u>Too shallow to profile.</u> <u>Typher is dead in the water.</u>				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>23/2/2018</u>		Checker Name and Signature: _____		Date: _____						
Project Manager Signature: _____		Date: _____		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 22/02/18		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H401156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved						
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
3:05	0			1.23	535	5.83	-61.9	23.8	514	
3:08				0.61	520	5.95	-79.0	22.5	494.5	
3:11				0.51	518	5.92	-64.7	22.4	491.5	
3:14	3			0.45	517	5.91	-57.9	22.4	491.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelker Wetlands		Fieldwork Staff:		Bore / Location ID: 74B		Sample Date: 22/2/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.3		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	(number in order):
Bore Depth (m-pvc): 1.98		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved							Parameters
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):		
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
2:53	0			2.06	416.6	5.78	-71.4	21.7	378		
2:57				0.36	403.5	5.39	-47.5	21.3	375		
2:41				0.29	403.4	5.36	-49.1	21.3	374.9		
2:44				0.26	403.1	5.34	-50.8	21.3	374.6		
2:47	4			0.23	402.8	5.34	-52.7	21.3	373.7		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T2F		Sample Date: 22/02/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.95		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 4.14		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out
Key Type (if applicable):				<input type="checkbox"/> Retrieved							Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
2:08	0			0.96	945	5.75	-75.8	20.2	860		
2:12				0.41	961	5.82	-72.1	19.6	862		
2:15				0.32	953	5.81	-66.3	19.3	852		
2:18	3			0.28	948	5.81	-64.8	19.5	847		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

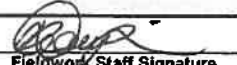
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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: B+12		Sample Date: 22/02/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 13.24		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 17.38		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve in	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
1:21	0			8.74	273.7	5.51	138.5	24.8	271.8		
1:24				8.72	269.5	5.45	160.3	24.2	265.5		
1:27				8.71	267.2	5.40	175.6	24.0	251.0		
1:31				8.65	256.5	5.37	183.2	24.1	251.0		
1:34				11.24	232.8	5.36	194.1	24.2	246.7		
1:37				9.65	246.9	5.32	200.6	23.9	247.2		
1:42	6			9.22	243.8	5.32	203.3	24.1	239.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beekar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-05		Sample Date: 22/02/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.71		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.93		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (galic/slick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C		Odour, Colour, Turbidity		
11:05	0			0.92	1352	5.37	-4.8	20.9	1245			
11:08				0.36	1329	5.37	-8.2	20.8	1214			
11:11				0.27	1308	5.39	-10.1	20.8	1201			
11:14				0.23	1301	5.34	-7.6	20.9	1196			
11:17				0.21	1296	5.31	-5.3	21.0	1196			
11:20	5			0.20	1291	5.30	-3.9	21.0	1193			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature: 		Date: 22/2/18		Checker Name and Signature: _____				Date: _____				
Project Manager Signature: _____		Date: _____		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: QW-T3EA		Sample Date: 22/2/16				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 3.15		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 3.75		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (galic/slick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odeur, Colour, Turbidity		
10:36	0			0.93	854	5.14	-10.4	20.6	776			
10:39				0.41	828	5.47	-22.8	20.5	785			
10:41				0.34	822	5.18	-27.6	20.5	753			
10:44				0.31	829	5.16	-28.5	20.5	757			
10:47	4			0.28	827	5.16	-28.8	20.6	736			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: T3C		Sample Date: 22/02/17			
General Bore Information					Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 0.33		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	Gauging
Bore Depth (m-pvc): 5.13		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Parameters
Key Type (if applicable):		<input type="checkbox"/> Retrieved									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
9:53	0			1.01	563	5.19	38.2	19.9	460		
9:56				0.34	378.9	5.32	33.2	19.9	335.7		
9:59				0.26	377.4	5.27	36.3	19	333.0		
10:02				0.23	378.6	5.25	34.3	18.9	355.1		
10:05				0.21	381.7	5.25	31.4	18.9	337.0		
10:08	5			0.20	386.9	5.22	28.9	18.9	341.0		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelief Wellands		Fieldwork Staff:		Bore / Location ID: B410		Sample Date: 22/2/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 1.845		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.64		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
9:25	0			0.80	301.2	5.99	-48.5	22.2	284.9		
9:29				0.27	301.5	6.03	-68.2	22.4	286.7		
9:32				0.21	302.0	6.07	-74.7	22.5	287.9		
9:36				0.19	302.1	6.09	-79.3	22.7	288.6		
9:39	4			0.17	300.2	6.09	-80.9	22.8	287.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: T3B		Sample Date: 22/02/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		Gauging	
Depth to GW (m-pvc): 1.935	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 8.83	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependant)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
9.06	0			0.69	215.5	5.68	-26.7	20.6	c	
9.09				0.33	229.2	5.75	-32.7	20.5	197.5	
9.12				0.26	231.8	5.74	-22.4	20.5	210.3	
9.15	3			0.23	231.8	5.73	-17.0	20.5	211.7	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature		Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wellands		Fieldwork Staff:		Bore / Location ID: LW-D3		Sample Date: 22/02/18			
General/Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 4.17		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 7.10		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in/out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity	
8:38	0			0.83	422.9	5.41	103.6	22.1	398.8		
8:41				0.35	396.5	5.32	98.8	22.1	372.5		
8:44				0.29	383.7	5.35	104.3	22.3	363.7		
8:48	3			0.29	378.1	5.38	103.6	22.4	358.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelii Wetlands		Fieldwork Staff:		Bore / Location ID: T3C		Sample Date: 8/3/18		
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:
Depth to GW (m-pvc): 0.48m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:
Bore Depth (m-pvc): 5.14m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):
Depth to Product (m-pvc):		Cover Type (gate/slick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
2:54	0			1.69	524	5.38	-21.2	21.6	477.5	
2:57	1			0.34	567	5.29	4.2	19.5	513	
3:00	2.25			0.28	602	5.21	16.1	19.4	538	
3:03	3.5			0.24	613	5.18	17.7	19.3	547	
3:06	4.75			0.21	614	5.17	16.9	19.3	548	
3:09	6			0.20	612	5.17	15.5	19.3	545	
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		R. Champion e Checker Name and Signature		8/3/18 Date				
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>		
Client: Main Roads		Project Location: Beelir Wetlands		Fieldwork Staff:		Bore / Location ID: BH10				
						Sample Date: 8/3/2018				
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.93m	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 5.66m	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
2:27	0			1.33	288.0	6.10	-36.0	22.5	274.1	
2:30	1.25			0.37	285.4	6.13	-58.8	22.5	272.0	
2:33	2.5			0.27	285.5	6.15	-65.4	22.8	273.3	
2:36	4			0.24	285.1	6.16	-69.7	22.8	273.3	
2:39	6.5			0.22	284.8	6.16	-71.0	22.8	273.1	
Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)										
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		R. Champion		8/3/18		Distribution: Project Central File		
Project Manager Signature		Date								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Bulking Rce 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wellands		Fieldwork Staff:		Bore / Location ID: T33			
						Sample Date: 8/3/2017			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 2.03m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 8.84m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gailc/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
2:04	0			2.60	234.1	5.78	-40.5	22.7	217.0
2:07	1.5			0.48	242.3	5.79	-33.4	20.9	224.0
2:10	2.75			0.33	247.2	5.77	-16.2	20.8	227.0
2:13	4			0.28	246.5	5.74	-5.8	20.7	226.4
2:16	5.5			0.25	245.6	5.73	-2.2	20.7	225.3
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		R. Champion		8/3/18		Date	
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: D1		Sample Date: 8/2/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.98m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 6.52m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
12:14	0			1.63	481.2	6.06	47.4	23.2	457.4			
12:17	1.5			0.36	456.3	5.62	86.9	22.2	428.8			
12:20	2.5			0.29	458.7	5.59	95.6	22.1	434.2			
12:23	3.75			0.25	454.3	5.57	98.1	22.1	428.1			
12:26	4.5			0.24	451.2	5.56	94.9	21.9	449.6			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)					Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		R. Champion				8/3/18		Date		
Project Manager Signature		Date		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: D2		Sample Date: 8/2/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.23m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.58m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				Monitoring sequence followed (number in order):	
										Gauging	
										Hydrasleeve in	
										Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		
11:36	0			2.76	541	5.94	75.6	22	Sol		
11:39	1.8			0.81	525	6.06	73.1	21.5	SO5		
11:42	2.5			0.68	538	6.07	74.0	21.5	SO2		
11:45	4			0.63	549	6.08	70.1	21.5	SO9		
11:48	5.25			0.56	549	6.08	60.2	21.5	SO9		
11:51	6.5			0.50	542	6.08	51.4	21.7	SO9		
11:54	7.75			0.45	544	6.08	47.4	21.6	SO9		
11:57	8.9			0.40	542	6.09	42.7	21.7	SO7		
12:00	9.5			0.37	537	6.08	42.5	21.9	SO3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion				8/3/18		Date	
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-05		Sample Date: 8/3/2018			
General Bore Information					Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.79m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	Gauging
Bore Depth (m-pvc): 5.95m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	Parameters
Key Type (if applicable):				<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:13	0			1.42	1316	5.79	-39.1	20.6	C 1192		
10:16	1			0.44	1289	5.57	-38.0	20.1	1170		
10:19	2			0.31	1279	5.49	-32.9	20.2	1161		
10:22	2.5			0.25	1275	5.46	-30.9	20.3	1162		
10:25	3.5			0.23	1273	5.44	-29.6	20.3	1158		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion				8/3/18		Date	
Project Manager Signature		Date		Distribution: Project Control File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: <u>GW-T3E-A</u>					
						Sample Date: <u>8/3/2018</u>					
General Bore Information			Parameter Info		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): <u>3.23</u>	Screen Interval (m):	Chem Kit Model:	<u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): <u>3.59</u>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging			
Depth to Product (m-pvc):	Cover Type (gailc/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	Hydrasleeve out			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved						Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9:12	0			1.84	859	5.53	-30.7	20.5	C 761		
9:15	1			0.46	842	5.22	-28.0	20	761		
9:18	2			0.32	831	5.22	-32.2	20.1	752		
9:21	3.25			0.26	831	5.21	-36.0	20.1	753		
9:24	4.5			0.23	844	5.17	-36.7	20.2	771		
9:27	6			0.22	849	5.15	-37.4	20.2	775		
9:30	7			0.22	855	5.14	-39.1	20.2	778		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQAØ1			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion			8/3/18		Date		
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60476410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T45		Sample Date: 8/3/2018		
General Bore Information			Parameter Info.			Decontamination		Well Development or Well Sampling Event? (circle)		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):			<input checked="" type="checkbox"/> Retrieved					Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
8:39	0			1.78	520	5.79	-46.2	21.9	484.7	tubing fell in well - unable to determine depth
8:42	0.5			0.63	518	5.92	-68.0	21.0	477.8	
8:45	1.5			0.38	518	5.93	-59.3	20.8	477.8	
8:48	2			0.31	518	5.93	-53.6	20.9	476.9	
8:51	3			0.27	518	5.93	-50.8	21.0	478.0	
8:54	4			0.25	517	5.93	-49.0	21.0	477.07	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		R. Champion			8/3/18		Date	
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T4B		Sample Date: 8/3/2018			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 1.12 m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 2 m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Type:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
8:18	0			1.64	399	5.43	-35.4	22	373.5		
8:16	1			0.26	395.6	5.36	-40.3	21	365.7 sulphur smell, opaque, muddy		
8:19	2			0.23	395.5	5.36	-44.0	21	365.5		
8:22	3			0.20	395.8	5.35	-48.2	21	365.7		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion				8/3/18			
				Checker Name and Signature				/Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>GW-D3</u>		Sample Date: <u>8/3/16</u>			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101158		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): <u>4.255</u>		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): <u>7.12</u>		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve in Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC ₂₅₅ (mg/L or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
7:36	0			1.25	421.1	5.95	53.9	21.9	393.6	No odour, clear.	
7:39	0.75			0.38	396.0	5.48	71.2	21.7	361.4		
7:42	1.5			0.28	382.7	5.47	80.6	21.8	359		
7:45	2.5			0.27	378.6	5.48	83.3	21.9	356.4		
7:48	3.25			0.27	376.4	5.49	84.6	21.9	354.0		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion		8/3/16					
				Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: NLWS-152					
						Sample Date: 9/3/18					
Well Development or Well Sampling Event? (circle)											
General Bore Information		Parameter Info.		Decontamination		Sampling Method					
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Hydrasleeve in/out Parameters					
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:		Total purged volume (L):							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm) or mg/L	-E.G. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
	20cm			4.33	4822	7.13	1.3	26.1	C	NTU	
									Too shallow to profile.		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion		9/3/18					
				Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGrath		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliam Wellands		Fieldwork Staff:		Bore / Location ID: <i>BL Jetty</i>			
						Sample Date: <i>9/3/18</i>			
General Bore Information				Parameter Info.		Sampling Method			
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Baller	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):			
Depth to Product (m-pvc):	Cover Type (galic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved				Hydrasleeve out Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
	<i>200cm</i>			<i>8.62</i>	<i>2524</i>	<i>8.67</i>	<i>5.6</i>	<i>24.8</i>	<i>C NTU</i> <i>2515 6.0</i>
									<i>Too shallow to profile</i>
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		R. Champion <i>[Signature]</i>		9/3/18		Date	
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeilar Wetlands		Fieldwork Staff:		Bore / Location ID: A2		Sample Date: 9/3/18			
General Bore Information			Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:			
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:			
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:			
		Key Type (if applicable):		<input type="checkbox"/> Retrieved				Sampling Start Time:			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity		
	15cm			8.79	2525	8.84	12.6	25.1	2532	7.3	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion			9/3/18		Date		
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BLWS-B1		Sample Date: 9/3/13				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	-EC. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
	20cm			10.65	2533	8.93	21.2	27.8	C	NTU	10.1	
	40cm			3.55	2531	8.88	8.2	27.7			4.9.9	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analyses Sampled for:		Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA02			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		R. Champion			9/3/13			Date		
Project Manager Signature		Date		Distribution: Project Central File								

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: G10-DA		Sample Date: 9/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 0.77m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 3.90m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	SPC (µS/cm or µS/cm)	pH	ORP (mV)	Temp °C	C Odour, Colour, Turbidity		
12:02	0			4.32	266.0	7.28	50.9	23.7	247.9		
12:05	1			4.00	253.6	6.44	80.9	22.8	242.8		
12:08	2			4.04	250.5	6.14	100.4	22.7	239.5		
12:11	3			4.15	250.1	6.04	109.1	22.8	239.3		
12:14	4			4.05	251.4	5.99	116.9	22.7	240.5		
12:17	5			4.06	251.5	5.96	118.0	22.8	240.8		
12:20	6										
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution											
Fieldwork Staff Signature		Date		R. Champion				9/3/18			
				Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelar Wetlands		Fieldwork Staff:		Bore / Location ID: GUN-DAS				
						Sample Date: 12/3/18				
General Bore Information				Parameter Info.		Decontamination				
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated				
Depth to GW (m-pvc): 10.38		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated				
Bore Depth (m-pvc): 11.68		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable				
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)				
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra				
		Key Type (if applicable):		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)				
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C	Odour, Colour, Turbidity
10:28	0			3.19	415.1	6.40	-59.6	28.1	434.5	pump stopped working.
10:31								24.7		
1:37				0.89	386.8	6.43	-118.5	24.7	378.5	
1:40				0.47	377.3	6.55	-127.3	22.5	358.5	
1:43				0.39	379.3	6.48	-124.7	22.0	350	
1:46				0.40	372.8	6.45	-122.4	21.8	349.7	
1:49				0.40	382.6	6.45	-121.4	21.9	358.8	
1:52				0.40	389.2	6.45	-120.2	21.9	365.3	
1:55	9L			0.41	385.6	6.44	-118.8	21.9	363.2	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		R. Champion			12/3/18		Date	
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 80478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH12			
						Sample Date: 12/3/18			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 10.78		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 14.75		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Waterra			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1.01	0			8.50	284.3	6.08	97.0	31.3	(C) 327.1
1.04				8.17	293.0	5.91	119.6	30.7	324.7
1.07				8.92	280.1	5.69	143.9	24.0	273.3
1.10				8.76	274.3	5.52	165.3	23.2	265.0
1.13	3.5			8.97	270.7	5.47	176.1	23.3	261.8
1.16				9	267.5	5.43	184.6	22.8	256.
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Farnous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. Bore has been shortened due to excavation		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		R. Champion 12/3/18		Checker Name and Signature		Date	
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: <u>BLWS-72</u>		Sample Date: <u>23/3/18</u>				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C NTU Odour, Colour, Turbidity			
10:52	15un			11.31	2851	8.82	11.8	25.2	2856	10.6		
10:55	30un			8.17	2782	8.90	-77.6	24.7	2768	30.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 80 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution:												
Fieldwork Staff Signature		Date		Chocker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH 12		Sample Date: 23/3/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 10.85m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		
Bore Depth (m-pvc): 14.73m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):		
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
12:46	0			8.71	295	6.48	-1.0	28.0	311	
12:49				8.77	283.0	5.84	69.4	24.8	280.4	
12:52				8.84	277.2	5.65	104.1	23.7	269.0	
12:55				8.91	275.1	5.53	121.2	23.4	266.9	
12:58				8.81	273.2	5.48	134.6	23.3	264.1	
1:01	4			8.87	272.2	5.45	141.0	23.5	264.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
				x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				
Approval and Distribution:										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A		Sample Date: 23/3/13			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 3.02m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 3.58m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		Odour, Colour, Turbidity
9:07	0			1.13	838	5.32	-16.6	20.6	759		
9:10	1			0.56	806	5.24	-35.2	20.2	731		
9:13	2			0.44	801	5.24	-41.0	20.2	729		
9:16	3			0.38	804	5.23	-43.2	20.3	732		
9:19	4			0.34	804	5.23	-45.1	20.3	732		
9:22	5			0.31	804	5.22	-46.6	20.3	732		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D 8		Sample Date: 23/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 10.42		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 11.76		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	5% E6. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
07:29	0			4.12	327	6.60	-83.5	19.6	294 Pump stopped working		
11:44	0			2.14	314.9	8.03	-167.8	24.1	355.1		
11:47				0.62	344.4	7.24	-163.1	21.7	328.1		
11:50				0.45	329.1	6.77	-145.6	21.5	307.1		
11:53				0.42	326.0	6.65	-138.9	21.4	303.6		
11:56				0.42	325.5	6.58	-133.0	21.4	303.2		
11:59				0.40	335.8	6.56	-129.9	21.3	312.3		
12:02	7 L			0.40	342.3	6.55	-128.4	21.3	318.1		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D5		Sample Date: 23/3/13				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.87m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.94m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		<input checked="" type="checkbox"/> Other (specify)		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
8:42				1.58	1177	6.11	-25.8	19.9	1063			
8:45	0.75			0.50	1186	5.75	-34.1	19.6	1063			
8:48	1.5			0.39	1166	5.68	-33.1	19.8	1063 1050			
8:51	2			0.35	1156	5.59	-30.5	19.8	1040			
8:54	3			0.29	1137	5.50	-25.3	19.8	1025			
8:57	4			0.27	1129	5.49	-26.0	19.9	1019			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: T2F			
						Sample Date: 23/3/18			
General Bore Information				Parameter Info		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101158		<input checked="" type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): 3.17		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): 4.15		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Peristaltic Pump			
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Waterra			
						<input checked="" type="checkbox"/> Other (specify)			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
08:03	0			2.35	470	6.24	-69.5	19.5	Strong sulphur odour
08:06	1			0.53	463	5.98	-80.3	19.1	
08:09	2			0.43	842	5.96	-75.4	19.1	
08:12	3			0.37	839	5.96	-72.4	19.1	
08:15	4			0.33	839	5.96	-70.2	19.1	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
						23/3/18			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: <i>KL SD</i>		Bore / Location ID: <i>T3C</i>		Sample Date: <i>22/3/18</i>			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): <i>0.62m</i>		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): <i>5.14m</i>		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gabic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve In	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity		
<i>11:32</i>	<i>0</i>			<i>3.00</i>	<i>525</i>	<i>5.93</i>	<i>-54.7</i>	<i>20.7</i>	<i>271</i>	<i>Strong sulphur odour</i>	
<i>11:35</i>	<i>1</i>			<i>0.37</i>	<i>446.2</i>	<i>5.39</i>	<i>-11.8</i>	<i>19.3</i>	<i>397.2</i>		
<i>11:38</i>	<i>2</i>			<i>0.28</i>	<i>447.0</i>	<i>5.32</i>	<i>-6.6</i>	<i>19.2</i>	<i>397.3</i>		
<i>11:42</i>	<i>3</i>			<i>0.25</i>	<i>448.8</i>	<i>5.29</i>	<i>-7.0</i>	<i>19.2</i>	<i>398.9</i>		
<i>11:44</i>	<i>4</i>			<i>0.23</i>	<i>450.1</i>	<i>5.29</i>	<i>-8.7</i>	<i>19.1</i>	<i>399.8</i>		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		<i>[Signature]</i> Checker Name and Signature		<i>22/3/18</i> Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: BH 10		Sample Date: 22/3/18				
General Bore Information					Parameter info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.99		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.63		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
11:10	0			1.51	267.4	6.05	-43.4	22.8	255.9			
11:13	1			0.34	267.4	6.12	-77.5	22.9	256.3			
11:16	2.5			0.25	267.0	6.15	-85.9	22.9	256.2			
11:19	4			0.23	265.7	6.17	-88.6	22.9	255.1			
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)												
Analytes Sampled for:		Bottles Collected					QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: RC SD		Bore / Location ID: T33		Sample Date: 22/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.06m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 8.85m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:50	0			1.41	222.2	5.93	-79.6	21.5	207.3	Strong sulphur odour	
10:53	1			0.41	247.1	5.77	-54.4	20.7	226.6		
10:56	2			0.32	246.2	5.76	-43.2	20.6	225.6		
10:59	3			0.28	244.8	5.75	-35.7	20.6	224.1		
10:02	4			0.27	243.9	5.75	-32.6	20.6	223.2		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelilar Wetlands		Fieldwork Staff: RC SD		Bore / Location ID: T43		Sample Date: 22/3/18			
General/Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 1.20m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 2.12m		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/slick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole						Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C		
09:42	0			4.88	385.6	5.95	-37.7	21.9	361.5		
09:45	1			0.58	389.4	5.44	-47.5	21.3	361.9		
09:48	2			0.40	388.9	5.39	-49.6	21.3	361.3		
09:51	3			0.30	389.2	5.37	-51.9	21.3	361.7		
09:54	4			0.29	389.2	5.37	-53.9	21.3	361.6		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan				
Client: Main Roads				Project Location: Beelihar Welllands		Fieldwork Staff:				
Bore / Location ID: <u>GW-D4</u>				Sample Date: <u>22/3/18</u>						
Well Development or Well Sampling Event? (circle)										
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101158	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): <u>80.80</u>	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): <u>4.91</u>	Casing Radius (mm):	Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailor	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity	
9:10	0			4.02	262.7	6.15	49.6	22.5	249.2	
9:13	1			3.13	260.6	6.01	75.7	22.5	247.2	
9:16	2			3.19	257.7	5.99	90.5	22.5	244.9	
9:19	3.5			3.28	257.0	5.97	99.5	22.5	244.9	
9:22	4.5			3.40	254.8	5.96	106.8	22.5	242.4	
9:25	5.5			3.50	253.9	5.96	110.7	22.5	241.5	
9:28										
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date	Checker Name and Signature			Date				
Project Manager Signature		Date	Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T4C		Sample Date: 22/3/18				
General/Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 5.84		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 10.92		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input checked="" type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	C Odour, Colour, Turbidity			
8:42	0			1.89	516	6.02	-45.5	22.0	418.1			
8:45	1.5			0.54	517	5.97	-48.1	21.2	479.5			
8:48	2			0.33	516	5.95	-46.7	20.9	478.6			
8:51	3			0.28	516	5.95	-47.7	20.8	475.0			
8:54	4			0.25	517	5.94	-48.5	20.8	475.3			
8:57	4.5			0.23	516	5.94	-49.3	20.8	474.8			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date						
Project Manager Signature		Date		Distribution: Project Central File								

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D3		Sample Date: 22/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 4.29m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 7.10m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (galic/slick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Monitoring sequence followed (number in order):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	Sp. Eq. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
08:14	0			1.30	392.2	5.69	75.1	22.8	C		
08:17	1			0.43	377.2	5.49	76.3	22.1			
08:20	2			0.33	372.7	5.48	80.5	22.1			
08:23	3			0.30	374.8	5.49	79.9	22.2			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeljar Wetlands		Fieldwork Staff:		Bore / Location ID: D2		Sample Date: 22/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 2.31m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.57m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailor <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Monitoring sequence followed (number in order):	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Gauging	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Hydrasleeve in	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):		Hydrasleeve out	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	NTU	C	Odour, Colour, Turbidity
7.27	0			1.97	593	6.67	85.1	21.6	21.6		548
7.30	1			0.40	568	6.14	92.4	21.2	130.3		527
7.33	2			0.30	573	6.11	80.8	21.3	252.4		532
7.35	3			0.27	585	6.11	78.8	21.4	356.4		586
7.38	4			0.25	582	6.12	72.8	21.4	491.1		540
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID: D1		Sample Date: 22/3/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow; Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 3.08		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Monitoring sequence followed (number in order):	
Bore Depth (m-pvc): 6.52		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Watertra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
7.49	0			2.15	458.1	6.28	-5.7	22.5	432.1		
7.52	1			0.45	447.4	5.75	50.0	22.0	421.0		
7.55	2			0.33	440.4	5.65	63.2	22.0	415.3		
7.58	3.5			0.28	441.0	5.62	69.4	21.9	415.1		
8.01	4.5			0.25	441.0	5.60	71.2	21.9	415.1		
8.04	5			0.23	443.2	5.58	71.2	21.9	417.2		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-T3E-A		Sample Date: 18/4/18		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.40	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging	
Bore Depth (m-pvc): 3.57	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO): No	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable): NA									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
14:43	0		0.75	1.42	789	5.49	-57.4	20.4	rain intermittent, sunny patches.	
14:46			0.75	0.52	794	5.13	-46.0	20.3	turbid	
14:49			0.75	0.36	790	5.09	-45.0	20.3	5% organic matter	
14:52			0.75	0.31	789	5.07	-46.3	20.3	strong sulphur odour.	
14:55	5		0.75	0.27	786	5.06	-47.6	20.3	colourless.	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: GWDEAT2F					
						Sample Date: 18/4/18					
General Bore Information				Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 3.27		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 4.08		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve out Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
14:07	0		0.75	1.20	862	5.80	20.8	20.8	• Raining		
14:10			0.75	0.48	843	5.77	10.5	19.9	• Sulphur smell		
14:13			0.75	0.37	824	5.75	-97.0	19.8	• clear / colourless water		
14:16	3		0.75	0.33	816	5.74	-91.8	19.6	•		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliiar Wetlands		Fieldwork Staff: OS/SD		Bore / Location ID: GWDS 18/4/18			
Sample Date: 18/4/18		Well Development or Well Sampling Event? (circle)							
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.98	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:	* Gauging		
Bore Depth (m-pvc): 5.97	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO): No	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time: 18/4/18	Parameters		
Key Type (if applicable): Yes (Key)									
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
13:38	0	2.98	75%	1.38	1523	5.56	-61.3	22.2	° morning rain - clear / sunny now
13:41			0.75	0.35	1547	5.43	-73.1	20.7	° cloudy / clear / low turbidity for
13:44			0.75	0.26	1485	5.32	-62.2	20.9	initial squirt
13:47	4.25		0.75	0.23	1477	5.25	-53.5	20.9	° sulphur odour ° small amount of organic matter
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)									
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date	Checker Name and Signature		Date				
Project Manager Signature		Date	Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: T3C		Sample Date: 18/4/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: 12/12		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 0.6 0.6		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 5.13		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up): S		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
1:10	0		0.75	0.260	544	5.78	-72.0	20.7	* colourless, clear - no turbidity			
1:13			0.75	0.51	560	5.35	-55.0	19.5	* odour - slight sulphur			
1:16			0.75	0.33	540	5.15	-25.2	19.4				
1:19			0.75	0.28	528	5.10	-16.2	19.4				
1:22	5.5		0.75	0.26	519	5.06	-12	19.4				
									* rained in the morning (clear now)			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: BH10		Sample Date: 18/4/10				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.04		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		Gauging
Bore Depth (m-pvc): 5.64		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO): YES		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters
Key Type (if applicable):												
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
12:41	0		75%	0.72	273.2	5.72	22.6	21.6	• Rained until 9am. Overcast/sunny			
12:44			75%	0.37	260.4	5.44	28.8	21.8	• viscose			
12:47			75%	0.28	252.6	5.39	38.5	21.9	• brown			
12:50	4		75%	0.26	247.1	5.39	340.8	21.9	• highly turbid			
									• initial brown squirt			
									• organic material throughout, H ₂ O became clearer after first 2 mins			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				• tubing (dedicated) needs to be replaced as internal				
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: T3B		Sample Date: 18/4/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 2.11		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 8.85		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up): Y/U		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
Key Type (if applicable): NA												Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:								Total purged volume (L):
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
12:08	0		75%	1.48	221.8	5.78	-86.7	21.5	• rained until 9am - overcast			
12:11			75%	0.71	228.0	5.71	-88.8	20.9	• (medium) sulphur odour			
12:14			75%	0.53	221.4	5.59	-60.0	20.7	• clear/ no turbidity			
12:17			75%	0.42	220.5	5.55	-43.7	20.7	• colourless.			
12:20	6		75%	0.39	220.2	5.53	-36.7	20.7				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: <u>SD/DS</u>		Bore / Location ID: <u>GW-D1</u>			
						Sample Date: <u>18/4/18</u>			
General Bore Information				Parameter Info.		Decontamination			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated			
Depth to GW (m-pvc): <u>3.16</u>		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated			
Bore Depth (m-pvc): <u>6.52</u>		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			
Product Thickness (m):		Bore Locked (YES/NO): <u>YES</u>		Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve			
		Key Type (if applicable): <u>Alan Key</u>		<input type="checkbox"/> Retrieved		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:53	0		70%	1.21	487.7	5.86	52.8	21.7	• overcast (rained 4:19 am) • no odour • no turbidity • colourless
10:56			70%	0.45	501	5.29	87.5	21.7	
10:59			75%	0.34	497.2	5.21	102.5	21.7	
11:02			75%	0.28	480.9	5.13	111.9	21.8	
11:05	5L		75%	0.27	481.3	5.13	113.1	21.8	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DE/SD		Bore / Location ID: D2			
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 18/4/18			
Depth to GW (m-pvc): 2.31		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)			
Bore Depth (m-pvc): 5.56		Casing Radius (mm):		Corrected Redox: Y / N		Monitoring sequence followed (number in order):			
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		Gauging			
Product Thickness (m):		Bore Locked (YES/NO): Yes		Parameter method: <input checked="" type="checkbox"/> Downhole		Hydrasleeve in			
Key Type (if applicable): Alan		Bore Locked (YES/NO): Yes		<input type="checkbox"/> Retrieved		Hydrasleeve out			
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:27	0		75-l.	1.49	481.3	5.94	65.9	21.3	• Overcast (rained all morning). • clear / no turbidity
10:30	1.5		75-l.	0.51	478.7	5.75	55.0	21.4	
10:33			75-l.	0.36	472.5	5.78	43.4	21.6	
10:36			75-l.	0.30	471.5	5.81	31.7	21.6	
10:39			75-l.	0.26	463.7	5.83	23.3	21.5	
10:42	7		70-l.	0.24	458.9	5.84	18.5	21.5	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: GWD4		Sample Date: 18/4/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 0.84		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 3.89		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable): Redlock		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):				
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
09:59	0		75%	3.75	249.2	5.99	65.0	21.4	• Rained in morning			
10:02			75%	2.86	252.6	5.65	103.9	22.1	• no odour			
10:05			75%	3.02	249.1	5.65	119.1	22.3	• clear/ no turbidity			
10:08	5		75%	2.96	250.2	5.65	124.7	22.3				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. slugs in well				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature			Date		Checker Name and Signature			Date				
Project Manager Signature			Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: GND3		Sample Date: 18/4/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 4.41		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 7.11		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Hydrasleeve Type:	
Depth to Product (m-pvc):		Cover Type (gatic/stick up): gatic		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Sampling Depth (m-pvc):	
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Hydrasleeve Install time:	
		Key Type (if applicable): Yes (padlock)								Sampling Start Time:	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
09:32	0		75-l	1.26	370.4	5.49	77.1	21.3	° overcast (rained all morning) ° no turbidity ° mild sulphur smell ° clear		
09:35			75-l	0.48	375.4	5.26	89.9	21.8			
09:38			75-l	0.34	374.9	5.28	93.4	21.9			
09:41	3.5		75-l	0.30	379.2	5.32	92.6	21.9			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. good condition				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: T4C		Sample Date: 19/4/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 5.92		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.92		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 10.9		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Monitoring sequence followed (number in order):	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Gauging	
										Hydrasleeve in	
										Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:07			75%	1.32	518	5.63	-56.4	20.4	• Clear, no odour, no turbidity • Intermittent rain • At 8:10 sulphur odour		
8:10			75%	0.60	519	5.71	-76.8	20.4			
8:13			75%	0.42	515	5.72	-73.2	20.4			
8:16			75%	0.34	515	5.73	-71.9	20.4			
8:19	4L		75%	0.3	515	5.74	-71.7	20.4			
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

AECOM

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliiar Wetlands		PM Name: Chris McGraghan		Bore / Location ID: R4B					
General Bore Information				Fieldwork Staff: DS/SD		Sample Date:					
Date of GW Level:		Parameter Info.		Decontamination		Well Development or Well Sampling Event? (circle)					
Depth to GW (m-pvc): 1.27		Bore Radius (mm):		<input type="checkbox"/> Decontaminated		Hydrasleeve Info.					
Bore Depth (m-pvc): 2.11		Screen Interval (m):		<input checked="" type="checkbox"/> Dedicated		Monitoring sequence followed (number in order):					
Depth to Product (m-pvc):		Casing Radius (mm):		<input checked="" type="checkbox"/> Disposable		Gauging					
Product Thickness (m):		Cover Type (gatic/stick up): None		<input type="checkbox"/> Other (specify)		Hydrasleeve in					
Calculated bore volume (L):		Bore Locked (YES/NO): No		<input checked="" type="checkbox"/> Downhole		Hydrasleeve out					
		Key Type (if applicable): NA		<input type="checkbox"/> Retrieved		Parameters					
		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
07:38	0.2		75.1	3.02	409.2	6.27	85.3	20.0	medium rain		
07:41			75.1	0.38	393.4	5.30	-41.0	20.8	no odour Sulphur smell.		
07:44			75.1	0.30	392.7	5.25	-47.1	20.8	No colour - clear		
07:47			75.1	0.28	393.3	5.21	-52.0	20.8	No turbidity		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

10-27

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

* 10 = Fill Time
 10 = Discharge Time
 20-30 = PSI

Surface Water: Groundwater:

Bore / Location ID: **GW D8**

Sample Date: **19/4/18**

Well Development or Well Sampling Event? (circle)

Project Name: Building Roe 8 Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beeliar Wetlands Fieldwork Staff: **DS/SD**

General Bore Information		Parameter Info.		Decontamination	Sampling Method	Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 10/10	Hydrasleeve Size:	Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 10.48	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:		
Bore Depth (m-pvc): 11.60	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO): NO	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out	
	Key Type (if applicable): Key w/padlock					Parameters	
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):				

Water Quality Parameters

Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
09:09	0	9	10/10*	3.44	330.1	6.66	-92.1	20.4	<ul style="list-style-type: none"> • Rained overnight, overcast • Replaced tubing • Turbid/cloudy • Sulphur odour • Grey / brown colour • No particulates
09:12				1.70	331.3	6.24	-100.2	20.6	
09:15				1.75	329.9	6.21	-100.0	20.7	
09:18	1.5L			1.91	325.5	6.23	-100.0	20.7	

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. • Replaced tubing 19/4/18
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

* Discharge Time = 10
 Fill Time = 10
 PSI =

Surface Water: Groundwater:

Bore / Location ID: BH 12

Sample Date:

Well Development or Well Sampling Event? (circle)

Project Name: Building Roe 8 Project Number: 60478410 PM Name: Chris McGraghan
 Client: Main Roads Project Location: Beeliar Wetlands Fieldwork Staff: DS/SD

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 10/10*	Hydrasleeve Size:	Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 9.86	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:			
Bore Depth (m-pvc): 17.14	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO): NO	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time:	Hydrasleeve out		
	Key Type (if applicable): NA						Parameters		
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						

Water Quality Parameters

Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
10:14	0	14	10/10*	7.86	579	8.06	-9.7	20.7	• Rained overnight/this morning • overcast • clear • No turbidity/ • No particles • No Odour
10:17			10/10	6.17	617	7.70	-4.8	20.9	
10:20			10/10	5.84	619	7.51	12.7	20.9	
10:23			10/10	5.75	620	7.40	25.3	21.3	
10:26			10/10	5.61	620	7.31	34.3	21.8	
10:29	2		10/10	5.57	621	7.27	37.8	22.0	

Acceptable Parameter Range: ±10% ±3% ±0.05 ±10 mV ±0.2 °C ±10% turbidity (if using a turbidity meter)

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. • Newly placed bore
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution

Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: BH12		Sample Date: 2/5/18	
General Bore Information				Parameter List		Sampling Method		Well Development or Well Sampling Event? (circle)	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Decontaminated: <input checked="" type="checkbox"/>		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 9.87m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Dedicated: <input checked="" type="checkbox"/>		Hydrasleeve Size:	
Bore Depth (m-pvc): 17.6m		Casing Radius (mm):		Corrected Redox: Y / (N)		Disposable: <input type="checkbox"/>		Intake depth:	
Depth to Product (m-pvc):		Cover Type (Saw/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		Bailer: <input type="checkbox"/>		Hydrasleeve Type:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		Peristaltic Pump: <input type="checkbox"/>		Hydrasleeve Install time:	
		Key Type (if applicable): NA		<input type="checkbox"/> Retrieved		Other (specify):		Sampling Start Time: 07:48 07:54	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
07:48	0.1		10/15	6.90	655	6.68	142.2	16.8	slightly cloudy, no odour,
07:51	0.2			5.62	702	6.49	147.2	19.1	
07:54	1L			5.41	704	6.46	145.9	19.3	no turbidity
07:57	2								
Acceptable Parameter Range:				±10%	±3%	±0.05	±10 mV	±0.2 °C	±10% turbidity (if using a turbidity meter)
Analysis Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: A2		Sample Date: 02/05/18	
Well Development or Well Sampling Event? (circle)									
General Bore Information		Parameter (pvc)		Decontamination		Sampling Method		Hydrasleeve Info	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:	Gauging			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Hydrasleeve in			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent) <input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra	Hydrasleeve Install time:	Sampling Start Time: 09:59	Hydrasleeve out			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time: 09:59	Parameters <input checked="" type="checkbox"/>				
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
09:59	135L			9.27	3032	8.74	17.9	17.5	<ul style="list-style-type: none"> • clear • slightly turbid slight turbidity • odourless • organic matter settled at waterbed.
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments	
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 50478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: D2					
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Sample Date: 02/05/2018					
Depth to GW (m-pvc): 2.30		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		Well Development or Well Sampling Event? (circle)					
Bore Depth (m-pvc): 5.56		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="radio"/>		Monitoring sequence followed (number in order):					
Depth to Product (m-pvc):		Cover Type (circle/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		Gauging					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		Hydrasleeve Type:					
		Key Type (if applicable): ALN		<input type="checkbox"/> Retrieved		Hydrasleeve Install time:					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Hydrasleeve out <input checked="" type="checkbox"/>					
Total purged volume (L):											
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
12:07	0		0.75	2.55	382.5	5.74	115.3	21.4	clear, colourless, no turbidity		
12:10			75%	0.93	807.2	5.71	89.7	21.3	no odour		
12:13				0.44	380.5	5.74	67.5	21.5			
12:15				0.40	381.6	5.77	56.9	21.6			
12:18	5.75			0.37	396.3	5.77	50.4	21.6			
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			• New tubing - dedicated to D2 (replace in 6 months).				
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>							
Bore / Location ID: D1		Sample Date: 02/05/18							
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)						
Client: Main Roads	Project Location: Beelihar Wetlands	Fieldwork Staff: SD/DS							
General Bore Information		Decontamination							
Date of GW Level:	Bore Radius (mm):	Chem Kil Serial No.: 17H101156	<input type="checkbox"/> Decontaminated						
Depth to GW (m-pvc): 3.19 m	Screen Interval (m):	Chem Kil Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated						
Bore Depth (m-pvc): 6.62 m	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/>	<input type="checkbox"/> Disposable						
Depth to Product (m-pvc):	Cover Type (radio stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra						
	Key Type (if applicable): A107	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)						
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):						
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
12:34	0		75%	1.60	4613	7.97	9.4	21.3	clear, colourless, no turbidity
12:37				0.46	462.5	5.53	41.8	21.6	
12:40				0.37	427.0	5.20	68.2	21.6	
12:43				0.35	453.5	5.08	82.8	21.5	
12:46	5			0.34	454.9	5.04	89.4	21.6	
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analyses Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA02-02-0518		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	Rinsofe				
Approval and Distribution									
Fieldwork Staff Signature		Date	Checker Name and Signature			Date			
Project Manager Signature		Date	Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beellar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-D3		Sample Date: 2/5/18			
General Bore Information					Decontamination		Sampling Method		Hydrasleeve Info		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 4.4m		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 7.12m		Casing Radius (mm):		Corrected Redox: Y / N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input checked="" type="checkbox"/> Other (specify)		Sampling Start Time: Hydrasleeve out	
		Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
1:01pm	0		70%	1.01	344.5	7.03	45.8	22.3	clear, colourless		
1:04				0.64	345.3	5.38	98.1	22.2			
1:07				0.47	330.2	5.12	117.4	22.4			
1:10				0.42	326.0	5.08	108.7	22.1			
1:13				0.41	332.4	5.10	99.7	22.0			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analyses Sampled for:		Bottles Collected:				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic			Tubing replaced - replace in 6 months				
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: SD/BS		Bore / Location ID: GW-D4		Sample Date: 02/05/18					
Well Development or Well Sampling Event? (circle)													
Date of GW Level:		Bore Radius (mm):		Chem Kil Serial No.: 17H101156		Decontamination: <input checked="" type="checkbox"/> Decontaminated		Sampling Method: <input checked="" type="checkbox"/> Low Flow; Pump rate:					
Depth to GW (m-pvc): 0.83		Screen Interval (m):		Chem Kil Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:					
Bore Depth (m-pvc): 3.91		Casing Radius (mm):		Corrected Redox: Y / @		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve					
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:					
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time: 13:42					
Key Type (if applicable):		Parameter method: <input type="checkbox"/> Retrieved						<input checked="" type="checkbox"/> Parameters					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed: 6		Total purged volume (L): 6							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity				
13:32	0			3.63	231.7	5.75	43.8	21.8	• clear/sunny				
13:35	2			3.17	221.7	5.63	70.9	21.9	• clear water				
13:38	3.5			3.04	241.1	5.61	79.5	21.9	• No turbidity				
13:41	5.7			3.27	237.4	5.60	84.3	21.9	• No odour				
Acceptable Parameter Range:		± 10%		± 3%		± 0.05		± 10 mV		± 0.2 °C		± 10% turbidity (if using a turbidity meter)	
Analyses Sampled for:		Bottles Collected				QA/QC Information		Field Comments					
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. <i>Tubing replaced - replace in 6 months</i>			
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic					
Approval and Distribution													
Fieldwork Staff Signature			Date			Checker Name and Signature			Date				
Project Manager Signature			Date			Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

				Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>					
Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Bore / Location ID: T4B					
Client: Main Roads		Project Location: Beeliam Wetlands		Fieldwork Staff: DS/SD		Sample Date: 03/05/18					
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method			Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 1.25m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 2.14m	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up): <input checked="" type="radio"/>	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO): <input checked="" type="checkbox"/>	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time: 1906		Hydrasleeve out		
	Key Type (if applicable): NA								Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed: 01		Total purged volume (L): 09					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:51	0		75%	1.42	392.7	6.22	-81.2	20.3	sulphur odour, no turbidity,		
8:54				0.45	391.7	5.47	-79.6	20.8			
8:57				0.34	359.5	5.24	-72.1	20.8	cloudy / opaque.		
9:00				0.28	390.2	5.15	-68.8	20.8			
9:03				0.25	390.0	5.11	-66.9	20.9			
9:06	9			0.24	389.8	5.08	-66.0	20.9			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				Tubing replaced			
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: T4C		Sample Date: 03/05/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.98		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 10.77		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time: 0944		Hydrasleeve in	
		Key Type (if applicable): NA		<input type="checkbox"/> Retrieved						Hydrasleeve out	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed: 01		Total purged volume (L): 6				Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
9:29	0		75%	7.02	515	6.65	-88.3	20.8	clear, colourless		
9:32				7.26	509	6.07	-72.5	20.9			
9:35				0.39	505	5.79	-83.5	20.5			
9:38				0.32	503	5.72	-71.5	20.4			
9:41				0.28	502	5.67	-64.1	20.4			
9:44	6			0.25	502	5.65	-60.6	20.4			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				* New tubing			
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		* lots of air in tubing. (whilst initial purging)			
Project Manager Signature		Date		Distribution: Project Central File							

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>					
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T3B					
Sample Date:		Well Development or Well Sampling Event? (circle)									
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 2.14	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 8.85	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved		<input type="checkbox"/> Other (specify)		Sampling Start Time: 10:19		Hydrasleeve out		
	Key Type (if applicable):								Parameters		
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
10:07	0		75%	1.05	218.9	7.02	-115.3	20.9	Clear, no colourless, slightly turbid, no odour		
10:10	1			0.43	216.8	5.86	-70.7	20.6			
10:13	1			0.35	216.2	5.62	-43.0	20.6			
10:16	1			0.30	215.8	5.53	-28.7	20.6			
10:19	6.5			0.28	215.8	5.49	-23.6	20.6			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc. Replaced tubing			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature			Date		Checker Name and Signature			Date			
Project Manager Signature			Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Bore / Location ID: BH10		Sample Date: 03/05/18	
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Fieldwork Staff: SD/DS
Client: Main Roads	Project Location: Beelihar Wetlands	Well Development or Well Sampling Event? (circle)	

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):			
Depth to GW (m-pvc): 2.06	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:				
Bore Depth (m-pvc): 5.66	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging		
Depth to Product (m-pvc):	Cover Type (gatic/stick up): SU	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO): YES	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time: 1045	Hydrasleeve out		
	Key Type (if applicable): Key					Parameters			
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed: 01	Total purged volume (L): 6.8						

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
1033	0	2.06	807	1.41	256.3	7.99	-91.2	21.9	• mild sulphur odour	
1036	1.5		"	0.44	245.1	6.01	-55.2	22.0	• clear to slightly cloudy	
1039	3		"	0.35	240.6	5.37	13.6	21.9	• low turbidity is low	
1042	4.5		"	0.34	235.3	5.27	30.8	21.9		
1045	6.8		"	0.35	231.4	5.21	39.8	21.9		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			

Analytes Sampled for:		Bottles Collected			QA/QC Information	Field Comments
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc. • Tubing replaced.
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic		

Approval and Distribution			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date
Project Manager Signature	Date	Distribution: Project Central File	

FQM - Groundwater Sampling and Purging Record

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: T3C		Sample Date: 03/05/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)		
Date of GW Level: 03/05/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow; Pump rate:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 0.60		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 5.15		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): Gauging	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time: Hydrasleeve in	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
Key Type (if applicable):				<input type="checkbox"/> Retrieved						Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
11:05	0			1.64	516	7.46	-135.7	19.8	colourless, clear, sulphur odour		
11:08				0.61	454.5	6.05	-132.3	19.0			
11:11				0.39	427.1	5.33	-81.4	19.0			
11:14				0.34	368.0	5.10	-56.3	19.0			
11:17				0.31	406.5	4.98	-37.5	19.1			
11:20				0.28	400.7	4.93	-26.5	19.1			
11:23	9			0.27	396.3	4.91	-16.9	19.1			
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)				
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-05		Sample Date: 03/05/18	
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Well Development or Well Sampling Event? (circle)
Date of GW Level:		Bore Radius (mm):	Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow; Pump rate: 75%		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 3.02		Screen Interval (m):	Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:	1
Bore Depth (m-pvc): 5.96		Casing Radius (mm):	Corrected Redox: Y / N		<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:	Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)	Sampling Start Time: 12:00	Sampling Depth (m-pvc):	Hydrasleeve out
Key Type (if applicable):								Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):			
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
11:45	0		75%	1.70	8593	7.56	854	21.5	clear, slightly opaque, some
11:48				0.57	1028	5.24	-40.4	20.0	
11:51				0.44	1070	5.12	-35.2	20.0	turbidity, no odour
11:54				0.37	1095	5.14	-36.5	20.0	
11:57				0.40	1105	5.13	-36.6	20.0	
12:00	7.5			0.37	1108	5.13	-36.3	20.1	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)	WQA03-030518		Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic	Rinse.		* Bore cover missing		
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: GW-T3-E-A		Sample Date: 03/05/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate: 75%		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.45		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Size:	
Bore Depth (m-pvc): 3.69		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input checked="" type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time: 12:59	
Key Type (if applicable):		<input type="checkbox"/> Retrieved								Hydrasleeve in	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
12:47	0		75%	0.56	538	5.06	-52.4	20.5	Initial → high turbidity, brown		
12:50				0.59	735	4.85	-40.2	20.4	↓		
12:53				0.67	727	4.80	-35.7	20.4	↓		
12:56				0.55	730	4.76	-36.1	20.4	then clear, with some turbidity		
12:59	7			0.55	731	4.75	-35.7	20.3	strong sulphur odour		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: DS/SD		Bore / Location ID: GW-T3C		Sample Date: 17-05-18		
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level: 17-05-18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		Gauging	
Depth to GW (m-pvc): 0.64	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:					
Bore Depth (m-pvc): 5.15	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input checked="" type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (grip/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input checked="" type="checkbox"/> Other (specify)	Sampling Start Time:		Parameters			
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
8:58	0		70%	1.87	425.4	6.47	-102.4	18.2	clear, colourless, no turbidity	
9:01				0.43	393.3	5.45	-79.8	18.6	sulphur odour	
9:04				0.32	380.2	5.08	-42.8	18.6		
9:07				0.29	375.0	5.05	-34.2	18.6		
9:10	5.5			0.27	371.5	5.03	-30.6	18.6		
									*bore radius not wide enough to take SWL whilst gauging!	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: 17-05-18		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: SB/DS		Bore / Location ID: 8BH12		Sample Date: 16/05/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 16/05	Bore Radius (mm): 50	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order)				
Depth to GW (m-pvc): 9.92	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:					
Bore Depth (m-pvc): 17.31	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging <input checked="" type="checkbox"/>			
Depth to Product (m-pvc):	Cover Type (gatic/stick up): S/U	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve in			
Product Thickness (m):	Bore Locked (YES/NO): No	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out			
Key Type (if applicable): NA											
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed: 3.5	Total purged volume (L):								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
8:31	0			5.49	613	6.94	190.5	18.2	• clear, colourless, no turbidity		
8:34	0.5			6.22	655	6.25	181.7	20.2			
8:37	1			6.01	748	6.02	170.6	20.3			
8:40	2.5			5.63	783	5.98	164.0	20.5			
8:43	3.5			5.88	802	5.95	157.9	20.6			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 16/5/18		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: <u>SD/DS</u>		Bore / Location ID: <u>GW-D8</u>		Sample Date: <u>16-05-18</u>		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level: <u>16/05/18</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101156</u>	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: <u>10/20</u>	Hydrasleeve Size:		Monitoring sequence followed (number in order):		Gauging	
Depth to GW (m-pvc): <u>10.54</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): <u>11.29</u>	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (<u>gate</u> /stick up):	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		Parameters	
Product Thickness (m):	Bore Locked (YES/ <u>NO</u>)	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable): <u>NA</u>	<input type="checkbox"/> Retrieved								
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
<u>09:14</u>	<u>0</u>	<u>10.58</u>	<u>10/20</u>	<u>2.93</u>	<u>346.8</u>	<u>6.93</u>	<u>-104.4</u>	<u>20.3</u>	<u>• strong sulphur smell</u> <u>• slight turbidity</u>	
<u>09:17</u>	<u>0.8</u>	<u>10.58</u>	<u>10/20</u>	<u>1.08</u>	<u>342.7</u>	<u>6.23</u>	<u>-116.2</u>	<u>20.6</u>		
<u>09:20</u>	<u>1</u>	<u>10.58</u>	<u>10/20</u>	<u>0.73</u>	<u>333.7</u>	<u>6.00</u>	<u>-113.1</u>	<u>20.6</u>		
<u>09:23</u>	<u>2</u>	<u>10.58</u>	<u>10/20</u>	<u>0.64</u>	<u>332.6</u>	<u>5.94</u>	<u>-110.6</u>	<u>20.6</u>		
<u>09:26</u>	<u>3</u>	<u>10.58</u>	<u>10/20</u>	<u>0.57</u>	<u>334.1</u>	<u>5.95</u>	<u>-108.5</u>	<u>20.6</u>		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Commets			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature: <u>[Signature]</u>		Date: <u>16/5/18</u>		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelair Wetlands		Fieldwork Staff:		Bore / Location ID:		Sample Date: 16/05/18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 1.27		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc): 2.11		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		<input checked="" type="checkbox"/> Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)			# purge volumes removed:			Total purged volume (L):			
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
10:28	0	1.27	75%	1.30	391.0	86.78	-81.6	21.1	cloudy, no turbidity sulphur odour			
10:31	1.54	1.52		0.66	387.3	5.33	-77.3	21.1				
10:34	1.54	1.54		0.45	385.9	5.14	-65.6	21.2				
10:37		1.52		0.37	385.2	5.09	-60.9	21.2				
10:40		1.53		0.31	384.7	5.07	-57.1	21.2				
10:43	6.5	1.40		0.27	383.8	5.05	-54.3	21.2				
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic						
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-TLC		Sample Date: 16-05-18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level: 16-05-18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 5.99		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 10.98		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in Parameters	
Calculated bore volume (L):			Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
11:00	0		757	1.90	503	6.47	-82.6	21.7	*Well radius not wide enough to take SWL.		
11:03				0.53	496.3	5.80	-96.0	20.5			
11:06				0.40	494.7	5.72	-81.7	20.4			
11:09				0.35	493.9	5.69	-73.2	20.4			
11:12	6.5			0.32	493.7	5.67	-70.4	20.4	Clear, colourless, odorless		
11:15									sulfur odour		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date: 16/5/18		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: GW-D4		Sample Date: 16/05/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 0.97 cm	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		✓ Gauging	
Bore Depth (m-pvc): 3.90	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Hydrasleeve in	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve out	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:			Total purged volume (L): 6					
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
11:40	0	0.93	45.1	3.83	233.1	6.58	15.8	21.8	• Slightly cloudy • low turbidity	
11:43	1	0.89	45.1	3.90	233.4	5.85	66.7	21.8		
11:46	2.5	0.89	45.1	3.89	233.2	5.67	93.3	21.8		
11:49	4.5	0.89	45.1	3.53	232.1	5.64	101.2	21.7		
11:52	6	0.89	45.1	3.73	233.6	5.61	104.5	21.7		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature:		Date: 16/5/18		Checker Name and Signature: _____			Date: _____			
Project Manager Signature: _____		Date: _____		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: A2S		Sample Date: 16/05/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:		Monitoring sequence followed (number in order):		<input checked="" type="checkbox"/> Gauging	
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / <u>N</u>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Hydrasleeve in		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input checked="" type="checkbox"/> Waterra	Hydrasleeve Install time:		Hydrasleeve out		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Parameters		
	Key Type (if applicable):									
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
12:54	15cm			10.39	2994	8.52	20.6	19.7	High turbidity, clear, colourless, organic matter.	
									*Algae/sludge on surface ~25m from location	
									NTU: 11.4	
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		<input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: BLNS-01		Sample Date: 16/05/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	Gauging
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Hydrasleeve in
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	Hydrasleeve out
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	Parameters
Key Type (if applicable):				<input type="checkbox"/> Retrieved							
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:				Total purged volume (L):			
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
12:57	60cm			8.8 3.10	2930	8.16	-157.6	18.83	Very high turbidity, colourless,		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		16/5/18		Date		Checker Name and Signature		Date			
Project Manager Signature				Date						Distribution: Project Central File	

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>				
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff:		Bore / Location ID: BL-Jetty		Sample Date: 16-05-18				
General Bore Information					Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):		Casing Radius (mm):		Corrected Redox: Y / N		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		Gauging
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out
		Key Type (if applicable):		<input type="checkbox"/> Retrieved								Parameters
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):		
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity			
									* Jetty has been repaired a too shallow to take readings			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic								
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature				Date				
Project Manager Signature		Date		Distribution: Project Central File								

ANZ

FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

				Surface Water:	<input type="checkbox"/>	Groundwater:	<input checked="" type="checkbox"/>		
				Bore / Location ID:	A2				
				Sample Date:	16-05-18				
Project Name:	Building Roe 8	Project Number:	60478410	PM Name:	Chris McGraghan				
Client:	Main Roads	Project Location:	Beelair Wetlands	Fieldwork Staff:					
Well Development or Well Sampling Event? (circle)									
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	Gauging
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	<input type="checkbox"/> Peristaltic Pump		<input type="checkbox"/> Waterra		Hydrasleeve Install time:
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve in
	Key Type (if applicable):			<input type="checkbox"/> Retrieved					Hydrasleeve out
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L):				
Water Quality Parameters									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity
1:06	20cm			11.2	2952	8.76	-15.2	20.9	Clear, colourless, medium turbidity, ammonia type odour
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic					
Approval and Distribution									
Fieldwork Staff Signature		Date		Checker Name and Signature		Date			
Project Manager Signature		Date		Distribution: Project Central File					

ANZ


FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: SD/ps		Bore / Location ID: GWT3EA		Sample Date: 16/05/18		
Well Development or Well Sampling Event? (circle)										
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):	
Depth to GW (m-pvc): 3.49	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:			
Bore Depth (m-pvc): 3.64	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):		<input checked="" type="checkbox"/> Gauging	
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L): 84				
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
2:21pm	0	3.50	45-l	1.31	735	6.33	-79.3	22.5	• sulphur odour is strong	
2:24	1	3.50	45-l	0.66	721	5.25	-54.4	20.7	• initial purge of brown water	
2:27	2	3.50	45-l	0.62	725	5.02	-45.1	20.6	• 10% organic matter	
2:30	3	3.50	45-l	0.60	727	4.94	-41.9	20.6	• become colourless water	
2:33	4	3.50	45-l	0.58	728	4.93	-41.6	20.6		
Acceptable Parameter Range:		± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)			
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Commets		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature		Date		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

ANZ
FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>								
Bore / Location ID: GW-D3		Sample Date: 16/05/18								
Project Name: Building Roe 8	Project Number: 60478410	PM Name: Chris McGraghan	Well Development or Well Sampling Event? (circle)							
Client: Main Roads	Project Location: Beelihar Wetlands	Fieldwork Staff:								
General Bore Information		Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level: 16-05-18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:		Monitoring sequence followed (number in order):		
Depth to GW (m-pvc): 4.45	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Hydrasleeve Type:				
Bore Depth (m-pvc): 7.12	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Sampling Depth (m-pvc):		Gauging		
Depth to Product (m-pvc):	Cover Type Gate/stick up :	(The correction to apply is probe dependent) <input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra		Hydrasleeve Install time:		Hydrasleeve in		
Product Thickness (m):	Bore Locked (YES/NO) NO	Parameter method: <input type="checkbox"/> Downhole	<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:		Hydrasleeve out	
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							Parameters	
Calculated bore volume (L):	Includes/ excludes bore annulus (circle)	# purge volumes removed:	Total purged volume (L):							
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity	
2:50	0		75%	1.58	419.6	5.77	-10.8	22.5	clear, colourless / no turbidity	
2:53				0.45	383.0	5.23	26.1	22.2		
2:56				0.33	371.7	5.15	372.2	22.2	no odour	
2:59				0.30	373.4	5.17	59.9	22.3		
3:02	5			0.30	374.4	5.18	63.2	22.3		
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)	
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments		
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.		
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic						
Approval and Distribution										
Fieldwork Staff Signature 		Date 16/5/18		Checker Name and Signature			Date			
Project Manager Signature		Date		Distribution: Project Central File						

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8				Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Client: Main Roads				Project Location: Beelihar Wetlands		Fieldwork Staff: SD/DS		Bore / Location ID: D2		Sample Date: 17/05/18	
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.			Decontamination		Sampling Method		Hydrasleeve Info.	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Hydrasleeve Size:	Monitoring sequence followed (number in order):		Gauging <input checked="" type="checkbox"/>		Hydrasleeve in	
Depth to GW (m-pvc): 2-35	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Hydrasleeve Type:						
Bore Depth (m-pvc): 5.59	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Bailer	<input type="checkbox"/> Hydrasleeve	Hydrasleeve out		Parameters			
Depth to Product (m-pvc):	Cover Type <input checked="" type="checkbox"/> gatic stick up:	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	<input checked="" type="checkbox"/> Peristaltic Pump	<input type="checkbox"/> Waterra						
Product Thickness (m):	Bore Locked (YES/NO): Yes	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	<input type="checkbox"/> Other (specify)		Sampling Start Time:					
	Key Type (if applicable): Altan					Sampling Start Time:					
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:		Total purged volume (L): 5					
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
07:06	0		45%	2.05	404	6.72	34.6	19.6	• Clear		
07:09	1		45%	0.67	396.3	6.04	18.3	20.7	• No turbidity		
07:12	2.5		0.45	0.47	400.8	5.97	-2.7	20.8	• No odour		
07:15	3.9		0.45	0.40	403.9	5.96	-20.5	20.9			
07:18	5		0.45	0.36	415.7	5.95	-27.2	20.9			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected			QA/QC Information		Field Comments				
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)			Bore volume calculation, bore condition, fate of tubing, redox correction etc. • Within baseline values for pH • Below guideline values for pH				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic							
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date					
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beelihar Wetlands		Fieldwork Staff: SD/AS		Bore / Location ID: D1		Sample Date: 17/05/18			
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve Info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	
Depth to GW (m-pvc): 3.20		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 6.54		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc):	
Depth to Product (m-pvc):		Cover Type (gatic/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)		<input type="checkbox"/> Other (specify)		Sampling Start Time:	
		Key Type (if applicable):		<input type="checkbox"/> Retrieved						Hydrasleeve in	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Hydrasleeve out	
										Parameters	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
07:33	0	3.2	0.45	1.44	484.7	7.33	-16.9	18.7	• Clear / colourless		
07:36	2	3.2	0.45	0.73	503	5.48	46.6	20.7	• No turbidity		
07:39	3	3.2	0.45	0.58	498.2	5.26	73.1	20.8	• 5% Organic matter		
07:42	4	3.2	0.45	0.52	501	5.17	87.5	20.8			
07:45	5	3.2	0.45	0.49	492.7	5.15	95.1	20.8			
Acceptable Parameter Range: ± 10% ± 3% ± 0.05 ± 10 mV ± 0.2 °C ± 10% turbidity (if using a turbidity meter)											
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:	Unfiltered:	x 40 mL Vial (HCl)	x 60 mL Ferrous	x 60 mL metals (HNO ₃)				Bore volume calculation, bore condition, fate of tubing, redox correction etc.			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	x 250 mL Plastic				• pH below baseline values & guideline values			
								• EC within baseline values			
Approval and Distribution											
Fieldwork Staff Signature		Date: 17/5/18		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

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FQM - Groundwater Sampling and Purging Record

Q4AN(EV)-405-FM1

Project Name: Building Roe 8		Project Number: 60478410		PM Name: Chris McGraghan		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Client: Main Roads		Project Location: Beeliar Wetlands		Fieldwork Staff:		Bore / Location ID: GW-DS		Sample Date: 17/5/18			
Well Development or Well Sampling Event? (circle)											
General Bore Information			Parameter Info.		Decontamination		Sampling Method		Hydrasleeve info.		
Date of GW Level:		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Hydrasleeve Size:	Monitoring sequence followed (number in order):
Depth to GW (m-pvc): 3.08		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:		Hydrasleeve Type:	
Bore Depth (m-pvc): 5.98		Casing Radius (mm):		Corrected Redox: Y / <u>N</u>		<input type="checkbox"/> Disposable		<input type="checkbox"/> Bailer <input type="checkbox"/> Hydrasleeve		Sampling Depth (m-pvc): <input checked="" type="checkbox"/> Gauging	
Depth to Product (m-pvc):		Cover Type (gate/stick up):		(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)		<input checked="" type="checkbox"/> Peristaltic Pump <input type="checkbox"/> Waterra		Hydrasleeve Install time:	
Product Thickness (m):		Bore Locked (YES/NO): <u>NO</u>		Parameter method: <input checked="" type="checkbox"/> Downhole				<input type="checkbox"/> Other (specify)		Sampling Start Time:	
Key Type (if applicable): <u>NA</u>				<input type="checkbox"/> Retrieved						Hydrasleeve in Parameters	
Calculated bore volume (L):		Includes/ excludes bore annulus (circle)		# purge volumes removed:						Total purged volume (L):	
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	DO (ppm or mg/L)	E.C. (mS/cm or µS/cm)	pH	Redox (mV)	Temp °C	Odour, Colour, Turbidity		
08:29	0	3.08	0.45	2.50	876	5.67	-38.0	19.1	• no sulphur odour mild		
08:32	3	3.06	0.45	0.55	911	5.02	-20.8	19.5	• no turbidity		
08:35	4	3.06	0.45	0.41	945	5.06	-32.2	19.5	• clear / colourless		
08:38	5	3.06	0.45	0.37	989	5.11	-41.0	19.5			
08:41	6	3.06	0.45	0.33	1018	5.16	-48.2	19.5			
Acceptable Parameter Range:				± 10%	± 3%	± 0.05	± 10 mV	± 0.2 °C	± 10% turbidity (if using a turbidity meter)		
Analytes Sampled for:		Bottles Collected				QA/QC Information		Field Comments			
Field Filtered:		Unfiltered:		x 40 mL Vial (HCl)		x 60 mL Ferrous		x 60 mL metals (HNO ₃)		Bore volume calculation, bore condition, fate of tubing, redox correction etc.	
				x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber		x 250 mL Plastic		• pH is below baseline & guideline values • EC is within baseline values	
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
Project Manager Signature		Date		Distribution: Project Central File							

Groundwater/Surface Water Sampling and Purging Record

Bore Information		Parameter Info		Decontamination		Sampling Method		Surface Water	Groundwater
Date of GW Level: 01/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	FI Decontaminated	FI Low Flow: Pump rate:	Bore Location: GW-T3E-A				
Depth to GW (m-pvc): 5.41	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	VI Dedicated	Intake depth:					
Bore Depth (m-pvc): 3.98	Casing Radius (mm):	Corrected Radix: Y / (0)	FI Disposable	Peristaltic Pump		Fieldwork Staff: SD/DS			
Depth to Product (m-pvc):	Cover Type (gate/stick up): Gate	(The correction to apply is probe dependent)	FI Other (specify):	Sample Date: 01/06/18		Project: Roe 8 Environmental Monitoring			
Product Thickness (m):	Bore Locked (YES/NO): NO	Parameter method: FI Downhole			PM Name: Linda Kirchner				
	Key Type (if applicable): NA	FI Retrieved							

Time	Conductivity (µS/cm)	pH	Temp (°C)	EC (µS/cm)	DO (mg/L)	Redox (mV)	Turbidity	Colour	Notes	
2:29	0	6.80	20.0	740	1.14	-145.8			• clear	
2:32	0.5	4.91	20.1	743	0.40	-82.5			• no turbidity	
2:35	1	4.68	20.1	745	0.30	-62.2			• no odour	
2:38	1.5	4.64	20.1	745	0.26	-58.7			• colourless	
2:41	2	4.65	20.1	743	0.25	-58.7				
Acceptable Stabilised Parameter Range for Sampling:				± 0.5	± 0.2 °C	± 5%	± 0.1	± 10 mV	± 10% turbidity	
Exceedances (Y/N):										

Analysis Submitted	Bottles Collected	DAT/PC Information	Field Comments (Bore condition, lit of filling, issue collection etc.)
x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic	x 60 mL Ferrous x 100 mL Amber x 60 mL metals (HNO ₃)	WQA01-01-06-18 Duplicate	

Contingency Actions for Exceedances

Surface Water Quality:
 Resample affected location within four weeks of original sampling event
 Contact PM and refer to DMMP and WMMP for further instructions.

Groundwater Levels:
 If bore is dry determine reason why (low groundwater, blocked bore).
 Determine cause for rapid change in groundwater level. Contact PM.




Groundwater Quality:
 Determine if reference bore water quality also exceeds trigger values, range and guidelines
 Resample affected bore within four weeks of original sampling event.
 Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.

pH (Surface Water and Groundwater):
 Measure pH daily for seven days to ensure recording is not an anomaly.
 Determine if reference groundwater bore water quality also exceeds targets. Contact PM.

Contingency Actions Taken:

Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Project Manager Signature	Date	Distribution: Project Central File
	01/06/18					


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decontamination		Sampling Method		Surface Water	Groundwater		
Date of GW Level: 3/05/18	Bore Radius (mm):	Chem Kit Serial No.: 17H161456	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore Location ID: CW-733-TYB	<input type="checkbox"/>	<input type="checkbox"/>	Intake depth:	Bore Location ID:	Bore Location ID:	Groundwater		
Depth to GW (m-pvc): 1.16	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Peristaltic Pump									
Bore Depth (m-pvc): 2.10	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	<input type="checkbox"/> Other (specify):	Peristaltic Pump	Peristaltic Pump	Peristaltic Pump	Peristaltic Pump	Peristaltic Pump	Peristaltic Pump	Peristaltic Pump		
Depth to Product (m-pvc):	Cover Type (gss/c/brick up): S/W	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved	Parameter method:	Parameter method:	Parameter method:	Parameter method:	Parameter method:	Parameter method:	Parameter method:		
Product Thickness (m):	Bore Locked (YES/NO): NO	Key Type (if applicable): NA	Date: 3/05/18		Project: Roe 8 Environmental Monitoring	PM Name: Linda Kirchner							
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	Flow (l/min)	Pump Rate	pH	Temp. (C)	EC (µmhos/cm)	ORP (mV)	Redox (mV)	NTU	Odour, Colour, Turbidity			
9:12	1		70%	5.04	19.8	375.2	0.87	-52.5	88	strong sulphur odour			
9:16	2		↓	4.91	20.0	337.0	0.52	-76.4	68	cloudy			
9:19	3		↓	4.86	20.1	374.5	0.41	-83.6	43.4	no turbidity			
9:22	4		↓	4.87	20.2	374.4	0.32	-88.2	33.6				
9:25	5		↓	4.89	20.2	373.5	0.28	-90.9	257.2				
Acceptable Stabilized Parameter Range for Sampling:				± 0.1	± 0.2°C	± 2%	± 1%	± 5 mV	± 30% turbidity				
Exceedances (Y/N):				Y	N	N	N/A	N/A	N/A				
Analyte Specification		Bottles Collected		QA/QC Information				Field Comments (bore condition, gas entrapment, equipment, etc.)					
		x 40 mL Vial (HCl)		x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber									
		x 250 mL Plastic		x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event Contact PM and refer to DMMP and WMMP for further instructions.													
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:							
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.													
Approval and Certification													
 Fieldwork Staff Signature		31/05/18 Date		 Checker Name and Signature				Date		 Project Manager Signature		Date	
Distribution: Project Central File													

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 31/05/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: GW-74C			
Depth to GW (m-pvc): 5.93		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input checked="" type="checkbox"/> Dedicated		Intake depth:					
Bore Depth (m-pvc): 10.88		Casing Radius (mm):		Corrected Redox: Y / <input checked="" type="checkbox"/> N		<input checked="" type="checkbox"/> Disposable		<input checked="" type="checkbox"/> Peristaltic Pump		Fieldwork Staff: DS/SD			
Depth to Product (m-pvc):		Cover Type (gatic/stick up): S/U		(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)				Project: Roe 8 Environmental Monitoring			
Product Thickness (m):		Bore Locked (YES/NO): No		Parameter method: <input checked="" type="checkbox"/> Downhole				Sample Date: 31/05/18		PM Name: Linda Kirchner			
		Key Type (if applicable): NA		<input type="checkbox"/> Retrieved									
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity			
9:53	0		70%	7.98	20.0	484.5	2.37	-141.6		clear, colourless, no turbidity,			
9:56				6.28	20.3	485.0	0.72	-143.1					
9:59				5.67	20.2	480.1	0.48	-117.4					
10:02				5.57	20.1	479.1	0.44	-106.2		sulphur odour.			
10:05				5.53	20.1	478.1	0.39	-100.6					
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity				
Exceedances (Y/N):				N	NA	N	NA	NA	N/A				
Analytes Sampled for:		Bottles Collected				QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)		x 60 mL Ferrous		WQA03-310518 Rinse							
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber									
		x 250 mL Plastic		x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:							
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.													
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.													
Approval and Distribution													
_____ Fieldwork Staff Signature		31/5/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		_____ Distribution: Project Central File	


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>	
Date of GW Level: 31/5/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: BLNS-B1					
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:							
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Peristaltic Pump		Fieldwork Staff: SD/DS					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date: 31/05/18		Project: Roe 8 Environmental Monitoring					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole			PM Name: Linda Kirchner						
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
10:49		30cm		8.25	14.0	2235	9.01	-18.7	10.3	<ul style="list-style-type: none"> Too shallow to profile. Brown colour Minimal turbidity clear 	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	N	NA	NA	Y		
Analytes Sampled for:		Bottles Collected			QA/QC Information			Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)		x 60 mL Ferrous	WQ A02 - 310518 duplicate sample			storms/rain - lake appears to have filled since last gauging round.			
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber							
		x 250 mL Plastic		x 60 mL metals (HNO ₃)							
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 _____ Fieldwork Staff Signature		01/06/18 _____ Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Central File	


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decommission		Sampling Method		Surface Water			
Date of GW Level: 3/5/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	F1	Decontaminated	F1	Low Flow: Pump rate	Surface Water		<input checked="" type="checkbox"/>	Groundwater	<input type="checkbox"/>		
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	F2	Dedicated	Intake depth:		Bore / Location ID:		A2S				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Retox: Y / N	F1	Disposable	Penstatic Pump		Fieldwork Staff:		SB/DS				
Depth to Product (m-pvc):	Cover Type (gripper/stick up):	(The correction to apply is probe dependent)	F3	Other (specify)	Sample Date: 31/05/18		Project:		Ree 8 Environmental Monitoring				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: F1 Downhole					Fieldwork:		Linda Kirchner				
	Key Type (if applicable):	F2 Retrieved											
Water Quality Data													
Time	Conductivity (µS/cm)	EC (µmhos/cm)	Flow Rate	pH	Temp (°C)	EC (µmhos/cm)	DO (ppm or % sat)	Redox (mV)	ORP	Colour, Turbidity			
10:44		20cm		7.79	14.0	2237	9.20	80.8	5.3	20cm depth • clear • minimal turbidity • brown colour			
Acceptable Standard Parameter Range for Sampling:				< 7.0	< 0.2 °C	< 2%	> 10%	> 10 mV	> 20% turbidity				
Exceedances (Y/N):				N	N	N	N	N	Y				
Analytes Sampled for:		Bottles Collected:		QA/QC Information:				Field Comments (bore condition, site condition, water collection etc):					
		x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic		x 60 mL Fernox x 100 mL Amber x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event Contact PM and refer to DMMP and WMMP for further instructions.													
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:							
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.													
Approval and Distribution													
[Signature] Fieldwork Staff Signature		01/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date			
Distribution: Project Control File													

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>		
Date of GW Level: 31/5/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: A2							
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Fieldwork Staff: SD/DS							
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump	Project: Roe 8 Environmental Monitoring							
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify):	Sample Date: 31/05/18	PM Name: Linda Kirchner							
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole										
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
11:06		15cm		8.47	14°C	2214	9.30	31.1	13.1	• clear - minimal turbidity - No turbidity		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				N	NA	N	NA	NA	Y			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	1	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	1	x 100 mL Amber								
		x 250 mL Plastic	1	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
 _____ Fieldwork Staff Signature		_____ Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
										Distribution: Project Central File		

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 1/6/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	Low Flow: Pump rate: 10		Bore / Location ID: BH12							
Depth to GW (m-pvc): 9.86	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: 20		Fieldwork Staff: AS/SD							
Bore Depth (m-pvc): 17.63	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Project: Roe 8 Environmental Monitoring							
Depth to Product (m-pvc):	Cover Type (cap/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date: 01/06/18		PM Name: Linda Kirchner							
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole											
Key Type (if applicable):		<input type="checkbox"/> Retrieved											
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity			
7:43	0			8.41	16.5	684	5.20	13.5		clean, colourless,			
7:46				7.59	18.2	766	5.08	29.5		no turbidity			
7:49				6.88	18.3	900	6.26	62.4		no odour ✓			
7:52				6.43	18.4	815	6.65	79.8					
7:55				6.04	18.3	817	6.80	96.8					
7:58				5.88	18.4	810	6.85	105.4					
8:01				5.80	18.3	810	6.88	110.8					
8:04	4.5			5.76	18.5	793	6.86	114.2					
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity				
Exceedances (Y/N):				baseline	N	NA	N	NA	NA	N/A			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)					
		x 40 mL Vial (HCl) 1 x 40 mL Vial (H ₂ SO ₄) 2 x 250 mL Plastic 1		x 60 mL Ferrous 1 x 100 mL Amber 1 x 60 mL metals (HNO ₃) 1		Rinsale WQA03_01-06-18							
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:							
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.													
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.													
Approval and Distribution													
 _____ Fieldwork Staff Signature		01/06/18 _____ Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		_____ Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Parameter Info		Decontamination		Sampling Method		Bore Label		
Date of GW Level: <u>01/06/18</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101155</u>	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: <u>GW-03</u>		Fieldwork Staff: <u>SD/DS</u>			
Depth to GW (m-pvc): <u>4.34</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:						
Bore Depth (m-pvc): <u>7.128</u>	Casing Radius (mm):	Corrected Redox: <u>Y / (N)</u>	<input type="checkbox"/> Discorable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: <u>Res 8 Environmental Monitoring</u>				
Depth to Product (m-pvc):	Cover Type (gauge/stick up): <u>gauge</u>	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	Sample Date: <u>01/06/18</u>				PI Name: <u>Linda Kirchner</u>		
Product Thickness (m):	Bore Locked (YES/NO): <u>NO</u>	Parameter method: <input checked="" type="checkbox"/> Downhole								
	Key Type (if applicable): <u>N/A</u>	<input type="checkbox"/> Retrieved								
Water Quality Parameters										
Time	Residuals via Retriever (L)	SWL (m-pvc)	Pump Rate	pH	Total Cl	ET (potential system)	DO (ppm or mg/L)	Redox (mV)	NTU	Other Data / Lab Use
<u>2:51</u>	<u>0</u>		<u>70.1</u>	<u>6.20</u>	<u>21.1</u>	<u>389.4</u>	<u>0.82</u>	<u>-2.8</u>		<u>clear, calm</u>
<u>8:54</u>				<u>5.29</u>	<u>21.4</u>	<u>366.4</u>	<u>0.48</u>	<u>33.2</u>		<u>no turbidity</u>
<u>2:57</u>	<u>1</u>			<u>5.12</u>	<u>21.5</u>	<u>364.6</u>	<u>0.37</u>	<u>52.2</u>		<u>no colour</u>
<u>9:00</u>	<u>6</u>			<u>5.11</u>	<u>21.5</u>	<u>364.2</u>	<u>0.36</u>	<u>57.8</u>		
Acceptable Site-Specific Parameter Range for Sampling:				<u>< 0.05</u>	<u>< 0.25</u>	<u>< 5%</u>	<u>> 10%</u>	<u>< 200 mV</u>	<u>< 10% turbidity</u>	
Exceedances (Y/N):				<u>N</u>	<u>N</u>	<u>N</u>	<u>N/A</u>	<u>N/A</u>	<u>N/A</u>	
Analytes Sampled For:		Bottles Utilized:		QA/QC Information:		Field Comments (pore conditions, etc. drilling, non-exceedances)				
		<input type="checkbox"/> x 40 mL Vial (HCl) <input checked="" type="checkbox"/> x 40 mL Vial (H ₂ SO ₄) <input type="checkbox"/> x 250 mL Plastic		<input type="checkbox"/> x 60 mL Ferrrous <input type="checkbox"/> x 100 mL AnSorb <input type="checkbox"/> x 60 mL metals (HNO ₃)						
Contingency Actions for Exceedances										
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.										
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.					Contingency Actions Taken:					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bore.										
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.										
Approval and Distribution										
Signature: <u>[Signature]</u> Fieldwork Staff Signature		Date: <u>01/06/18</u> Date		Signature: _____ Checker Name and Signature		Date: _____ Date		Signature: _____ Project Manager Signature		Date: _____ Date
Distribution: Project Contact File										

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Parameter Info		Decontamination		Sampling Method		Surface Water		
Date of GW Level: <u>01/06/18</u>	Bore Radius (mm):	Chem Kit Serial No.: <u>17H101155</u>	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore Location ID: <u>GW-D4</u>		Groundwater: <input checked="" type="checkbox"/>			
Depth to GW (m-pvc): <u>6.66</u>	Screen Interval (m):	Chem Kit Model: <u>YSI Pro DSS</u>	<input checked="" type="checkbox"/> Dedicated	Intake depth:						
Bore Depth (m-pvc): <u>3.90</u>	Casing Radius (mm):	Corrected Redox: <u>Y / ()</u>	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump						
Depth to Product (m-pvc):	Cover Type (<u>gaskets</u> back up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	Sample Date: <u>01/06/18</u>		Fieldwork Staff: <u>SD/DS</u>		Project: <u>Res 8 Environmental Monitoring</u>		
Product Thickness (m):	Bore Locked (YES/NO): <u>()</u>	Parameter method: <input type="checkbox"/> Downhole				PI Name: <u>Linda Kirchner</u>				
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								

Time	Conductivity Not Reported ()	Temp ()	Temp ()	pH	Temp ()	EC ()	DO ()	Redox ()	RTU	Other Color Turbidity
<u>8:35</u>	<u>0</u>			<u>8.23</u>	<u>18.8</u>	<u>173.1</u>	<u>3.62</u>	<u>20.2</u>		<u>initial turbidity</u>
<u>9:38</u>				<u>6.99</u>	<u>19.3</u>	<u>172.3</u>	<u>3.12</u>	<u>53.4</u>		<u>clear colorless</u>
<u>9:41</u>				<u>6.23</u>	<u>19.4</u>	<u>171.3</u>	<u>2.90</u>	<u>13.2</u>		<u>no below</u>
<u>9:44</u>				<u>5.91</u>	<u>19.6</u>	<u>172.7</u>	<u>2.72</u>	<u>86.9</u>		
<u>9:47</u>				<u>5.79</u>	<u>19.8</u>	<u>174.8</u>	<u>2.57</u>	<u>96.0</u>		
<u>9:50</u>				<u>5.76</u>	<u>19.8</u>	<u>177.6</u>	<u>2.49</u>	<u>99.7</u>		
Acceptable Stabilized Parameter Range for Sampling:				<u>6.0</u>	<u>18.0</u>	<u>175</u>	<u>3.0</u>	<u>100</u>	<u>100</u>	
Exceedances (Y/N):				<u>N</u>	<u>N</u>	<u>Y</u>	<u>N</u>	<u>N</u>	<u>N/A</u>	

Analysis Sampled for:	Bottles Collected:	QA/QC Information	Field Comments (bore condition, rate of tubing, ream correction, etc.)
<ul style="list-style-type: none"> <u>2</u> x 40 mL Vial (HCl) <u>2</u> x 40 mL Vial (H₂SO₄) <u>1</u> x 250 mL Plastic 	<ul style="list-style-type: none"> <u>1</u> x 60 mL Ferrous <u>1</u> x 100 mL Amber <u>1</u> x 60 mL Metals (HNO₃) 		

Contingency Actions for Exceedances


Surface Water Quality:
Resample affected location within four weeks of original sampling event.
Contact PM and refer to DMMP and WMMP for further instructions.

Groundwater Levels:
If bore is dry determine reason why (low groundwater, blocked bore).
Determine cause for rapid change in groundwater level. Contact PM.

Groundwater Quality:
Determine if reference bore water quality also exceeds trigger values, range and guidelines.
Resample affected bore within four weeks of original sampling event.
Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.

pH (Surface Water and Groundwater):
Measure pH daily for seven days to ensure recording is not an anomaly.
Determine if reference groundwater bore water quality also exceeds targets. Contact PM.

Approved and Distributed

	<u>01/06/18</u>					
Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Project Manager Signature	Date	Distribution: Project Central File


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decontamination		Sampling Method		Borehole Status			
Date of GW Level: 01/06/18	Bore Radius (mm):	Chem Kit Serial No.: 128101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 25.30	<input type="checkbox"/> Surface Water	<input checked="" type="checkbox"/> Groundwater	Bore / Location ID: GW-08						
Depth to GW (m-pvc): 10.55	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: 10.20									
Bore Depth (m-pvc): 11.76	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	<input type="checkbox"/> Peristaltic Pump									
Depth to Product (m-pvc):	Cover Type (stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):										
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: K Downhole	<input type="checkbox"/> Retrieved										
	Key Type (if applicable):												
Water Quality Parameters													
Time	Conductivity (µS/cm)	pH	Temp (°C)	DO (mg/L)	ORP (mV)	Redox (mV)	NTU	Other: Odour, Turbidity					
10:36	0		7.30	1.99	330.5	237	-116.5	Initial strong sulphur odour, slightly cloudy					
10:39			6.38	20.4	325.9	135	-119.7						
10:42			6.10	20.5	325.1	149	-117.1						
10:45			6.05	20.5	320.4	1.39	-113	When Res. resumes, yellow, no turbidity, no odour					
Acceptable Stabilised Parameter Range for Sampling:				±0.5	±0.2 °C	±2%	±2%	±10 mV	NTU				
Exceedances (Y/N):				Y	N/A	N	N/A	Field Comments (bore condition, date of logging, redox, etc.)					
Analytical Sample Vials		Bottles Collected		Chain of Custody Information				Field Comments (bore condition, date of logging, redox, etc.)					
		1 x 40 mL Vial (HCl)		1 x 60 mL Ferrous									
		2 x 40 mL Vial (H ₂ SO ₄)		1 x 100 mL Amber									
		1 x 250 mL Plastic		1 x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Action Taken:							
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM													
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bore.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM													
Approval and Distribution													
Fieldwork Staff Signature		Date: 01/06/18		Checker Name and Signature		Date		Project Manager Signature		Date			
Distribution: Project Central File													


Groundwater/Surface Water Sampling and Purging Record

Borehole Information				Parameter Info		Decontamination		Sampling Method		Surface Water		
Date of GW Level: 1/6/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101155	Chem Kit Model: YSI Pro DSS	Decontaminated: <input checked="" type="checkbox"/>	Low Flow: Pump rate:	Bore Location ID: D2		Penstatic Pump		Fieldwork Staff: DS/SD		
Depth to GW (m-pvc): 2.12	Screen Interval (m):	Corrected Redox: Y / N	Parameter method: <input checked="" type="checkbox"/> Downhole	Dedicated: <input checked="" type="checkbox"/>	Intake depth:	Project: Res 8 Environmental Monitoring		Other (specify):		Site Name: Linda Kechner		
Bore Depth (m-pvc): 5.57	Casing Radius (mm):	Cover Type (gas/tick up):	Parameter method: <input checked="" type="checkbox"/> Retrieved	Disposable: <input checked="" type="checkbox"/>	Sample Date: 1/6/18	Fieldwork Staff: DS/SD		Project: Res 8 Environmental Monitoring		Site Name: Linda Kechner		
Depth to Product (m-pvc):	Cover Locked (YES/NO):	Key Type (if applicable):										
Water Quality Parameters												
Time	Cumulative Vol. Recovered (L)	pH	Temp (°C)	EC (µmhos/cm)	DO (ppm)	ORP (mV)	Redox (mV)	Turbidity (NTU)	Other: Color, Turbidity			
11:11	0	7.04	20.6	441.2	1.65	-12.5			slightly cloudy, no turbidity			
11:14	1	6.08	21.1	428.3	0.43	6.3						
11:17		5.76	21.1	412.9	0.31	4.2			then clear, no odor			
11:20	4	5.74	21.1	419.6	0.29	4.1						
Acceptable Stabilized Parameter Range for Sampling:				< 8.0	+0.2/0.5	100	> 1.0	> 10 mV	< 10% turbidity			
Exceedances (Y/N):				N	NA	N	NA	NA	NA			
Analytes Sampled For			Bottles Collected			QA/QC Information			Field Comments (bore condition, pH of turbidity, redox, conductivity, etc.)			
			x 40 mL Vial (HCl) 1 x 40 mL Vial (H ₂ SO ₄) 2 x 250 mL Plastic 1			x 60 mL Ferrous 1 x 100 mL Amber 1 x 60 mL metals (HNO ₃) 1						
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
[Signature]		01/06/18		_____		_____		_____		_____		
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date		
Distribution: Project Control File												

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decontamination		Sampling Method		Surface Water		
Date of GW Level: 1/6/18	Bore Radius (mm):	Chem Kit Serial No.: T7H101155	Decontaminated <input checked="" type="checkbox"/>		Low Flow: Pump rate:		Bore Location ID: D1		<input type="checkbox"/> Groundwater <input checked="" type="checkbox"/>			
Depth to GW (m-pvc): 3.02	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	Dedicated <input checked="" type="checkbox"/>		Intake depth:		Fieldwork Staff: JB/SD					
Bore Depth (m-pvc): 6.54	Casing Radius (mm):	Corrected Redox: Y / N	Disposable <input checked="" type="checkbox"/>		Penetrate Pump:		Project: Roe B Environmental Monitoring					
Depth to Product (m-pvc):	Cover Type (gauge/stick up):	(The correction to apply is probe dependent)	Other (specify):		Sample Date: 1/6/18		PM Name: Linda Kirchner					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved									
	Key Type (if applicable):											
Time	Discharge Vol. Measured (L)	Flow (m-pvc)	Pump Rate	pH	Temp (°C)	EC (µmhos/cm)	ORP (mV)	Redox (mV)	YTD	Colour, Turbidity		
11:33	0.8	3.02	90%	8.22	20.1	454.5	1.46	-8.2	139.4	• clear		
11:36	1			5.63	20.8	449.5	0.41	35.9	954.9	• no turbidity		
11:39	1.5			5.19	20.9	453.4	0.35	57.8	1024.9	• no odour		
11:42	2			5.03	20.9	452.0	0.30	83.5		• 27 organic matter		
11:45	2.5			4.96	20.7	454.9	0.28	98.1				
11:48	3			4.95	20.8	448.5	0.26	104.6				
Acceptable Standard Parameter Range for Sampling:				> 6.5	< 30 °C	< 1500	> 100	> 10 mV	> 10% turbidity			
Exceedances (Y/N):				Y	NA	N	NA	NA	NA			
Analysis Sampled for:		Baffles Detected		QA/QC Information				Field Comments (bore condition, flow status, rock distribution, etc.)				
x 40 mL Vial (HCl)												
x 40 mL Vial (H ₂ O ₂)												
x 250 mL Plastic												
x 60 mL Ferrous												
x 100 mL Amber												
x 60 mL Metals (HNO ₃)												
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore) Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
 _____ Fieldwork Staff Signature		01/06/18 _____ Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
Distribution: Project Central File												

Groundwater/Surface Water Sampling and Purging Record

General Bore Information			Pump/Probe Info		Decontamination		Sampling Method		Borehole Water	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	<input type="checkbox"/> Surface Water		<input type="checkbox"/> Groundwater		Borehole Location ID:	<input type="checkbox"/>
Depth to GW (m-pvc): 2.05	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	<input type="checkbox"/>		<input type="checkbox"/>		T3B	<input checked="" type="checkbox"/>
Bore Depth (m-pvc): 9.86	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Penetrable Pump:	<input type="checkbox"/>		<input type="checkbox"/>		Fieldwork Staff:	SD/DS
Depth to Product (m-pvc):	Cover Type (gallon/bulk up): S/U	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify):		<input type="checkbox"/>		<input type="checkbox"/>		Project:	Res & Environmental Monitoring
Product Thickness (m):	Bore Locked (YES/NO): NO	Parameter method: <input checked="" type="checkbox"/> Downhole			<input type="checkbox"/>		<input type="checkbox"/>		PM Name:	Linda Kirchner
	Key Type (if applicable): NA	<input type="checkbox"/> Retrieved			<input type="checkbox"/>		<input type="checkbox"/>			
Data Entry and Reporting										
Time	Distilled or Vol. Removed (L)	AWL (ppmv)	Pump Rate	pH	Temp (C)	EC (µmhos/cm)	ORP (mV)	Redox (mV)	NTU	Odour, Colour, Turbidity
12:37	0			7.80	20.4	217.2	1.55	-105.2		clear
12:40	0.5			6.20	20.5	205.3	0.57	-110.3		no turbidity
12:43	1			5.57	20.5	199.6	0.49	-74.2		odour slight sulphur
12:46	1.5			5.43	20.5	197.3	0.44	-58.4		
12:49	2			5.38	20.5	196.3	0.40	-49.4		
Acceptable Stabilized Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 5%	± 10%	± 10 mV	± 10 NTU	
				N	NA	Y	NA	NA	NA	
Analytes Sampled for			Bottles Collected		QA/QC Information			Field Comments (pH, sand, etc. of tubing, probe correction, etc.)		
			x 40 mL Vial (HCl)	x 60 mL Ferrous						
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber						
			x 250 mL Plastic	x 60 mL metals (HNO ₃)						
Contingency Actions for Exceedances										
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.										
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.										
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.										
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.										
Approval and Distribution										
 Fieldwork Staff Signature		01/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date
Distribution: Project Central File										

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info				Decontamination		Sampling Method		Surface Water	Groundwater	
Date of GW Level: 01/06/18		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		<input type="checkbox"/> FI Decontaminated <input checked="" type="checkbox"/> IV Dedicated <input type="checkbox"/> FI Disposable <input type="checkbox"/> FI Other (specify)		<input type="checkbox"/> FI Low Flow: Pump rate <input checked="" type="checkbox"/> FI Peristaltic Pumps		Bore Location ID: BH10	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
Depth to GW (m-pvc): 1.87		Screen Interval (m):		Chem Kit Model: YSI Pro DSS				Intake depth:		Reference Bore: SD/DS				
Bore Depth (m-pvc): 5.63		Casing Radius (mm):		Corrected Redox: Y / (N)		(The correction to apply to probe dependent)				Project: Roe B Environmental Monitoring				
Depth to Product (m-pvc):		Cover Type (gate/stuck up): S/U		Parameter method: PM Downhole				Sample Date: 01/06/18		PM Name: Linda Kirchner				
Product Thickness (m):		Bore Locked (YES/NO): YES		Parameter method: FI Retrieved										
		Key Type (if applicable): KCM												
Water Quality Parameters														
Time	Quantity Vol Pumped (L)	QMC (m-pvc)	Pump Rate	pH	Temp (°C)	EC (µmhos/cm)	DO (ppm or % sat)	Redox (mV)	RTU	Colour/Turbidity/Turbidity				
1:00	0			8.39	20.9	242.6	1.38	-88.1		• clear				
1:03	0.5			5.93	21.1	232.0	0.45	-22.8		• no turbidity				
1:06	1			5.25	21.2	226.4	0.39	33.0						
1:09	1.5			4.94	21.2	223.6	0.33	78.1						
1:12	2			4.87	21.2	220.7	0.31	88.4						
1:15	2.5			4.83	21.1	216.4	0.29	92.7						
Acceptable Stabilized Parameter Range for Sampling:				Temp	> 12°C	< 30°C	> 10% DO	> 200 mV	> 10% RTU					
Exceedances (Y/N):				Y	N	Y	N	N	NA					
Analytical Substrate		Bottles Collected		QA/QC Information				Field Comments (pump condition, rate of filling, redox correction etc.)						
		x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic		x 60 mL Ferrous x 100 mL Amber x 80 mL metals (HNO ₃)										
Contingency Actions for Exceedances														
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions						Contingency Actions Taken:								
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.														
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.														
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.														
Approval and Distribution														
_____ Fieldwork Staff Signature		01/06/18 Date		_____ Checker Name and Signature				_____ Date		_____ Project Manager Signature		_____ Date		Distribution: Project Central File

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Parameter Info		Decontamination		Sampling Method		Surface Water	
Date of GW Level: 01/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	<input type="checkbox"/> Surface Water	<input type="checkbox"/> Groundwater	<input checked="" type="checkbox"/>	Bore Location ID: T3C	
Depth to GW (m-pvc): 0.34	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Bore Location ID: T3C			Fieldwork Shift: SD/OS	
Bore Depth (m-pvc): 5.14	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump	Fieldwork Shift: SD/OS			Project: Roe 8 Environmental Monitoring	
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):	Sample Date: 01/06/18	Project: Roe 8 Environmental Monitoring			Field Staff: Linda Krohner	
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole							
	Key Type (if applicable):	<input type="checkbox"/> Retrieved							

Time	Conductivity (µmhos/cm)	pH	Temp (°C)	EC (µmhos/cm)	DO (mg/L)	Temp (°F)	ORP (mV)	Notes
01:29pm	0	8.28	18.7	390.3	2.53	-92.6		• clear
1:32	0.5	6.22	18.6	361.4	0.61	-83.6		• no turbidity
1:35	1	5.22	18.6	357.7	0.44	-28.3		• strong sulphur odour
1:38	1.5	4.93	18.6	349.8	0.38	5.5		
1:41	2	4.85	18.7	348.7	0.36	3.5		
1:44	2.5	4.81	18.6	347.7	0.34	5.2		

Acceptable Stabilised Parameter Range for Sampling:	± 0.05	± 0.2 °C	± 5%	± 10%	± 10 mV	± 10% stability
Exceedances (Y/N):	Y	N	N	N	N	NA

Analyte Sampled for:	Bottles collected:	QA/QC Information:	Field Comments (only completion, firm drinking water correction slip)
<input type="checkbox"/> x 40 mL Vial (HCl) <input type="checkbox"/> x 40 mL Vial (H ₂ SO ₄) <input type="checkbox"/> x 250 mL Plastic	<input type="checkbox"/> x 60 mL Ferrous <input type="checkbox"/> x 100 mL Amber <input type="checkbox"/> x 60 mL metals (HNO ₃)		


Contingency Actions for Exceedances

Surface Water Quality:
 Resample affected location within four weeks of original sampling event
 Contact PM and refer to DNMP and WMMP for further instructions.


Groundwater Levels:
 If bore is dry determine reason why (low groundwater, blocked bore).
 Determine cause for rapid change in groundwater level. Contact PM.

Groundwater Quality:
 Determine if reference bore water quality also exceeds trigger values, range and guidelines.
 Resample affected bore within four weeks of original sampling event.
 Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.

pH (Surface Water and Groundwater):
 Measure pH daily for seven days to ensure recording is not an anomaly.
 Determine if reference groundwater bore water quality also exceeds targets. Contact PM.

Approval and Distribution				
	01/06/18			
Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Distribution: Project Central File

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decontamination		Sampling Method		Surface Water	
Date of GW Level: 01/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate.	<input type="checkbox"/> Surface Water		<input checked="" type="checkbox"/> Groundwater		Bore Location ID: GW-05		
Depth to GW (m-pvc): 3.02	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Intake depth					Bore Problem Start: 80/05		
Bore Depth (m-pvc): 5.98	Casing Radius (mm):	Corrected Redox: Y / (N)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump					Project: Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gabc/stck up): 5/2 Gate	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):						PM Name: Linda Kirchner		
Product Thickness (m):	Bore Locked (YES/NO): No	Parameter method: <input checked="" type="checkbox"/> Downhole			Sample Date: 01/06/18						
	Key Type (if applicable): NA	<input type="checkbox"/> Retrieved									
Water Quality Parameters											
Time	Capacitance Vial Reservoir (L)	Bore (m-pvc)	Purge Rate	pH	Temp (C)	EC (microsiemens)	DO (ppm or mg/L)	Redox (mV)	RTD	Colour, Odour, Turbidity	
2:00	0			8.00	19.7	870	1.76	-46.9		• clear	
2:03	2.5			5.28	19.6	881	0.53	-4.2		• no turbidity	
2:06	4			4.80	19.6	887	0.39	16.5		• slight sulphur odour	
2:09	4.5			4.83	19.6	921	0.37	3.4		• yellow	
2:12	5			4.89	19.5	985	0.44	-13.2			
2:15	5.5			4.92	19.5	998	0.42	-21.5			
Acceptable Stabilized Parameter Range for Sampling:				< 8.5	< 21.0	< 200	> 10%	> -10 mV	> 10% turbidity		
Exceedances (Y/N):				Y	NA	N	NA	NA	NA		
Alkalinity Standards (mg)				Acidity Calculated		QA/QC Information				Field Comments (bore condition, flow of tubing, ready collection etc.)	
x 40 mL Vial (HCO ₃)				x 60 mL Ferrous							
x 40 mL Vial (H ₂ SO ₄)				x 100 mL Amber							
x 250 mL Plastic				x 60 mL metals (HNO ₃)							
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.											
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bore.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		01/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
Distribution: Project Control File											

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>		
Date of GW Level: 15/6/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated		<input type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: AS		Project: Roe 8 Environmental Monitoring			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input type="checkbox"/> Dedicated		Intake depth:		Fieldwork Staff: CT/DS		PM Name: Linda Kirchner			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable		<input type="checkbox"/> Peristaltic Pump		Sample Date:					
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole										
	Key Type (if applicable):	<input type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
9:34		0.2		8.10	14.1	1758	8.00	47.4	6.3	Very clear		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				NA		NA		NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.												
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:						
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date		
										Distribution: Project Central File		


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>										
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:			Bore / Location ID: A2S												
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:				Fieldwork Staff: cu/DJ											
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	<input type="checkbox"/> Peristaltic Pump				Project: Roe 8 Environmental Monitoring											
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)					PM Name: Linda Kirchner											
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	Sample Date:															
	Key Type (if applicable):			<input type="checkbox"/> Retrieved																
Water Quality Parameters																				
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity										
9:22		0-20		9.28	14.4	1764	7.20	30.8	1.6	Very clear/still, can see bottom										
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity											
Exceedances (Y/N):				N	NA	N	NA	NA	Y											
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)												
		x 40 mL Vial (HCl)	x 60 mL Ferrous																	
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber																	
		x 250 mL Plastic	x 60 mL metals (HNO ₃)																	
Contingency Actions for Exceedances																				
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.																				
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.																				
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.																				
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.																				
Contingency Actions Taken:																				
Turbidity is lower than baseline; very still clear water No further action required																				
Approval and Distribution																				
Fieldwork Staff Signature			Date			Checker Name and Signature			Date			Project Manager Signature			Date			Distribution: Project Central File		

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:			Bore / Location ID: BLNS-B1			
Depth to GW (m-pvc):	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:				Fieldwork Staff: CH/DS		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump				Project: Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)					PM Name: Linda Kirchner		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input type="checkbox"/> Downhole	Sample Date: 15/6/18						
	Key Type (if applicable):			<input type="checkbox"/> Retrieved							
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
9:24		0-30		8.05	14.4	1773	7-30	28.6	1.5		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	N	NA	NA	Y		
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: Turbidity lower than baseline ; very still clear water. No further action required.					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date	
										Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 15/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	Low Flow: Pump rate: 30	Bore / Location ID: GW-D8						
Depth to GW (m-pvc): 10.51	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Fieldwork Staff: Ctt/DS						
Bore Depth (m-pvc): 11.75	Casing Radius (mm):	Corrected Redox: Y/(N)	<input type="checkbox"/> Disposable	Peristaltic Pump	Project: Roe 8 Environmental Monitoring						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date:	PM Name: Linda Kirchner						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole									
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
8:48	0		35/35	5.91	16.4	316.0	3.05	-56.0		clear, colourless, no odour	
8:51	0.2		30/30	6.03	17.6	317.3	2.22	-85.9		"	
8:54	0.5		30/30	6.08	18.1	321.1	2.26	-92.8		"	
8:57	1		30/30	6.12	18.5	322.7	2.55	-93.5		"	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y (QL/BL)	NA	N	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.											
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		15/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 15/6/18	Bore Radius (mm): 150	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate: 50%	Bore / Location ID: GW-D3				
Depth to GW (m-pvc): 4.21	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: DS/CH			
Bore Depth (m-pvc): 7.10	Casing Radius (mm): 50	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: Roe 8 Environmental Monitoring			
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date: 15/6/18		PM Name: Linda Kirchner			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole							
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved							

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity
7:42	0.2		50%	5.55	18.8	421.5	1.30	31.2		Clear, colourless, no odour
7:45			"	5.30	20.1	424.0	0.58	11.7		
7:48	1.2		"	5.20	20.4	415.3	0.45	7.7		
7:51			"	5.22	20.6	400.0	0.40	10.8		
7:54	2		"	5.16	20.7	383.8	0.37	20.6		
7:57			"	5.12	20.7	373.1	0.35	20.7		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity	
Exceedances (Y/N):				Y (B/G)	NA	N	NA	NA		

Analytes Sampled for:	Bottles Collected	QA/QC Information	Field Comments (bore condition, fate of tubing, redox correction etc.)
	x 40 mL Vial (HCl)	x 60 mL Ferrous	
	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	
	x 250 mL Plastic	x 60 mL metals (HNO ₃)	

Contingency Actions for Exceedances


Surface Water Quality:
Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.

Groundwater Levels:
If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.


Groundwater Quality:
Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.

pH (Surface Water and Groundwater):
Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.


Contingency Actions Taken:

Approval and Distribution							
 Fieldwork Staff Signature	15/6/18 Date	_____ Checker Name and Signature	_____ Date	_____ Project Manager Signature	_____ Date	Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level: 15/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	Low Flow: Pump rate: 15		Bore / Location ID: BH12						
Depth to GW (m-pvc): 9.77	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: 10.5		Fieldwork Staff: CH/DS						
Bore Depth (m-pvc): 17.41	Casing Radius (mm):	Corrected Redox: Y (N)	<input type="checkbox"/> Disposable	Peristaltic Pump		Project: Roe 8 Environmental Monitoring						
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date:		PM Name: Linda Kirchner						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole										
Key Type (if applicable):		<input type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
7:14			15	8.03	16.6	710	8.98	32.5		-colourless, slight turbidity, no odour		
7:17			15	7.07	19.5	781	7.55	54.7		"		
7:20			15	6.30	19.7	766	7.81	79.3		"		
7:23			15	5.99	19.8	743	8.29	93.4		"		
7:26	3.5		15	5.85	19.8	721	8.57	90.2				
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (GL)	NA	N	NA	NA				
Analytes Sampled for:			Bottles Collected			QA/QC Information			Field Comments (bore condition, fate of tubing, redox correction etc.)			
			x 40 mL Vial (HCl)	x 60 mL Ferrous								
			x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
			x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances												
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>												
Contingency Actions Taken:												
Approval and Distribution												
 Fieldwork Staff Signature		15/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		Distribution: Project Central File


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level: 14/06/18	Bore Radius (mm): 150	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: GW-T3E-A		Sample Date:		Fieldwork Staff: CH/DS			
Depth to GW (m-pvc): 3.29	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Project: Roe 8 Environmental Monitoring		PM Name: Linda Kirchner				
Bore Depth (m-pvc): 3.51	Casing Radius (mm): 50	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump								
Depth to Product (m-pvc): -	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)									
Product Thickness (m): -	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole <input type="checkbox"/> Retrieved										
Key Type (if applicable):												
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
3:32	0.5		50%	4.86	20.1	737	0.96	-36.6	-	Clear, colourless, slight decaying leaves odour		
3:35	1.5		"	4.81	20.1	733	1.07	-48.9	-	"		
3:38	2		"	4.80	20.1	736	0.82	-53.1	-	"		
3:41	3		"	4.80	20.1	735	0.70	-58.0	-	"		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (pH)	NA	N	NA	NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
 Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
										Distribution: Project Central File		

Groundwater/Surface Water Sampling and Purging Record

General Bore Information			Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 50%	Bore / Location ID: GAW-DS		Sample Date:		Project: Roe 8 Environmental Monitoring			
Depth to GW (m-pvc): 2.91	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: CH/DS		PM Name: Linda Kirchner				
Bore Depth (m-pvc): 5.91	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump								
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole										
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp. °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
2:58			50%	4.91	19.4	946	1.65	84.0		Brown, slightly turbid, odourless		
3:01	1		"	4.83	19.3	952	0.66	76.5		"		
3:04	2		"	4.80	19.3	957	0.50	58.7		"		
3:07	3		"	4.78	19.3	972	0.39	39.3		Light brown, clear, odourless		
3:10	3.5		"	4.77	19.2	975	0.37	26.7		"		
3:13	4		"	4.76	19.2	960	0.34	13.9		"		
3:16	5		"	4.76	19.2	972	0.33	8.6		"		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (BL/G/L)	NA	N	NA	NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous					Sand around				
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>												
Contingency Actions Taken:												
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date		
		14/06/18										


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: T3C		Fieldwork Staff: CH/DS		Project: Roe 8 Environmental Monitoring		
Depth to GW (m-pvc): 0.21	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Peristaltic Pump		PM Name: Linda Kirchner				
Bore Depth (m-pvc): 5.14	Casing Radius (mm):	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable									
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			Sample Date:							
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
14:33	0		50%	5.49	18.2	354.9	4.71	67.6		colourless, clear, odourless, noturb		
14:36			50%	4.92	18.3	354.2	0.77	15.2		"		
14:40			50%	4.84	18.4	352.2	0.47	10.4		"		
14:43			50%	4.83	18.3	351.7	0.41	9.9		"		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (BL/GAL)	NA	N	NA	NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
 Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
Distribution: Project Central File												


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: BH10				
Depth to GW (m-pvc): 1.702	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	<input checked="" type="checkbox"/> Intake depth:								
Bore Depth (m-pvc): 5.65	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump								
Depth to Product (m-pvc):	Cover Type (gatic/stick up): S/U	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO): YES	Parameter method: <input checked="" type="checkbox"/> Downhole										
	Key Type (if applicable): Key	<input type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
14:07	0		50%	5.48	20.1	245.0	3.70	27.4				
14:10	1	1.71	50%	5.52	20.3	250.3	3.47	44.0		"clear, light brown, no turbidity, odourless"		
14:13	2	1.71	50%	5.52	20.3	249.2	3.42	53.9		"		
14:16	3	1.71	50%	5.53	20.3	245.9	3.28	61.6		"		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (GL)	NA	Y (BL)	NA	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.												
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Contingency Actions Taken:												
Approval and Distribution												
_____ Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
Distribution: Project Central File												


Groundwater/Surface Water Sampling and Purging Record

General Bore Information			Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: T3B		Intake depth:		Fieldwork Staff:			
Depth to GW (m-pvc): 1.88	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Peristaltic Pump		Project: Roe 8 Environmental Monitoring		PM Name: Linda Kirchner				
Bore Depth (m-pvc): 8.83	Casing Radius (mm): 20mm	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Sample Date:								
Depth to Product (m-pvc):	Cover Type (gatic/stick up): S/Y	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)									
Product Thickness (m):	Bore Locked (YES/NO): No	Parameter method: <input type="checkbox"/> Downhole										
	Key Type (if applicable):	<input type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
13:46	0		50%	5.66	20.8	206.0	1.16	-78.3		• colourless, odourless, no turbidity		
13:49	2		"	5.41	20.6	184.5	0.44	-70.0		"		
13:52	3		"	5.39	20.5	169.0	0.39	-53.2		"		
13:55	3.5		"	5.37	20.5	167.5	0.37	-49.6		"		
13:58	4		"	5.36	20.4	166.6	0.37	-46.6		"		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y (pH)	NA	Y (E.C.)	NA	NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)				
		x 40 mL Vial (HCl)	x 60 mL Ferrous									
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber									
		x 250 mL Plastic	x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
 Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		
										Distribution: Project Central File		


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input type="checkbox"/>	
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: GW-04					
Depth to GW (m-pvc): 0.511	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Fieldwork Staff: CH/DS					
Bore Depth (m-pvc): 3.9	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump	Project: Roe 8 Environmental Monitoring					
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	Parameter method: <input checked="" type="checkbox"/> Downhole		<input type="checkbox"/> Other (specify)	Sample Date:	PM Name: Linda Kirchner					
Product Thickness (m):	Bore Locked (YES/NO):	<input type="checkbox"/> Retrieved									
Key Type (if applicable):											
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
12:27		0.515	50%	5.67	19.6	275.5	2.85	42.9	-	Clear, colourless, odourless	
12:30		0.519	"	5.70	19.6	273.5	2.44	58.7	-	"	
12:33		0.518	"	5.71	19.6	271.6	2.26	69.4	-	"	
12:36	3.5	0.518		5.69	19.7	267.0	2.28	76.9	-	"	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y (GL)	NA	Y (GL)	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
Distribution: Project Central File											

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 14/6/17	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: T4C					
Depth to GW (m-pvc): 5.83	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: CH/DS					
Bore Depth (m-pvc): 10.93	Casing Radius (mm): 20mm	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: Roe 8 Environmental Monitoring					
Depth to Product (m-pvc):	Cover Type (gatic/stick up): S/U	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date:		PM Name: Linda Kirchner					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input type="checkbox"/> Downhole									
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
12:00	0.6		50%	5.51	20.5	482.4	0.92	-79.0	-	Clear, colourless, slight sulphur odour	
12:03	1.0		"	5.57	20.4	480.1	0.52	-96.8	-	"	
12:06	2		"	5.56	20.3	475.3	0.41	-86.7	-	"	
12:09	2.5		"	5.56	20.3	474.4	0.38	-79.9	-	"	
12:02	3		"	5.55	20.3	473.7	0.35	-74.8	-	"	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y (pH)	NA	N	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.											
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken:					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		14/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
Distribution: Project Central File											

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 14/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated		<input checked="" type="checkbox"/> Low Flow: Pump rate:		Bore / Location ID: T4B		Fieldwork Staff: CH/DS		
Depth to GW (m-pvc): 2.11	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated		Intake depth:		Project: Roe 8 Environmental Monitoring		PM Name: Linda Kirchner		
Bore Depth (m-pvc): 2.11	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input checked="" type="checkbox"/> Disposable		Peristaltic Pump		Sample Date:				
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)								
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole <input type="checkbox"/> Retrieved									
Key Type (if applicable):											
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
11:30	0.981.11	0	50%	7.36	19.8	382.4	2.30	-42.9		• clear, no turbidity, colourless, no odour	
11:33	1.10	1	40%	5.22	20.0	382.3	0.55	-79.1		"	
11:36	1.10	1.5	40%	4.97	19.9	381.1	0.45	-76.0		"	
11:39	1.10	2	40%	4.92	19.9	380.7	0.38	-77.3			
11:42	1.10		40%	4.91	19.9	380.7	0.34	-79.2			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y (GL/BL)	NA	N	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		19/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
Distribution: Project Central File											

Groundwater/Surface Water Sampling and Purging Record


General Bore Information		Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 14/6/18	Bore Radius (mm): 150	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate: 50%		Bore / Location ID: D1					
Depth to GW (m-pvc): 2.918	Screen Interval (m): -	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: 6		Fieldwork Staff: DS x CH					
Bore Depth (m-pvc): 6.53	Casing Radius (mm): 50	Corrected Redox: Y / N	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: Roe 8 Environmental Monitoring					
Depth to Product (m-pvc): -	Cover Type (gatic/stick up): Gatic	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)	Sample Date:		PM Name: Linda Kirchner					
Product Thickness (m): -	Bore Locked (YES/NO): Yes	Parameter method: <input type="checkbox"/> Downhole	<input checked="" type="checkbox"/> Retrieved								
	Key Type (if applicable): Ailen										

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity
10:54	0	507.4	2.914	7.10	19.2	458.2	1.96	68.7	-	Colourless, slightly turbid, no odour
10:57	1	2.914	50%	5.33	20.6	462.1	0.53	107.0	-	Colourless, clear, no odour
11:00	2	2.914	"	5.03	20.5	462.2	0.43	118.5	-	"
11:03	3	2.914	"	5.00	20.6	465.2	0.35	122.4	-	"
11:06	35	2.914	"	5.01	20.8	465.6	0.34	122.4	-	"


Acceptable Stabilised Parameter Range for Sampling:	± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity
Exceedances (Y/N):	(8) Y (2) N	NA	N	NA	NA	

Analytes Sampled for:	Bottles Collected	QA/QC Information	Field Comments (bore condition, fate of tubing, redox correction etc.)
	x 40 mL Vial (HCl)	x 80 mL Ferrous	Tree roots in well.
	x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber	
	x 250 mL Plastic	x 80 mL metals (HNO ₃)	

Contingency Actions for Exceedances		Contingency Actions Taken:	
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>			

Approval and Distribution					
	14/06/18				
Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Project Manager Signature	Date
Distribution: Project Central File					

Groundwater/Surface Water Sampling and Purging Record


General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 14/6/18	Bore Radius (mm): 150	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate: 50%		Bore / Location ID: D2							
Depth to GW (m-pvc): 2.025	Screen Interval (m): -	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth: 5		Fieldwork Staff: DS & CH							
Bore Depth (m-pvc): 5.57	Casing Radius (mm): 750	Corrected Redox: Y 1.10	<input type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: Roe 8 Environmental Monitoring							
Depth to Product (m-pvc): -	Cover Type (gatic/stick up): Gatic	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date:		PM Name: Linda Kirchner							
Product Thickness (m): -	Bore Locked (YES/NO): YES	Parameter method: <input type="checkbox"/> Downhole											
	Key Type (if applicable): Allen	<input checked="" type="checkbox"/> Retrieved											
Water Quality Parameters													
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity			
10:13	0.2	2.020	75%	5.70	20.2	462.5	1.33	143.0	-	Turbid, light brown, no odour			
10:16			50%	5.74	20.7	467.4	0.52	117.6	-	"			
10:20	1	2.024	50%	5.82	20.2	471.1	1.56	109.8	-	"			
10:23		2.024	50%	5.78	20.6	465.9	0.38	81.0	-	"			
10:26	2.9	2.02	"	5.79	20.7	452.3	0.34	89.6	-	"			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity				
Exceedances (Y/N):				Y (GL)	NA	N	NA	NA					
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)					
		x 40 mL Vial (HCl) x 60 mL Ferrous x 40 mL Vial (H ₂ SO ₄) x 100 mL Amber x 250 mL Plastic x 60 mL metals (HNO ₃)						Sunny, warm					
Contingency Actions for Exceedances													
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:							
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.													
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.													
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.													
Approval and Distribution													
 _____ Fieldwork Staff Signature		14/06/18 _____ Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date		Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record


General Bore Information		Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		D2	
Depth to GW (m-pvc): 1.91	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:		SD/DS
Bore Depth (m-pvc): 5.63	Casing Radius (mm):	Corrected Redox:	Y / (N)	<input type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 8 Environmental Monitoring
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	Sample Date:		PM Name:		Linda Kirchner
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:		<input checked="" type="checkbox"/> Downhole					
	Key Type (if applicable):			<input type="checkbox"/> Retrieved					

Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity
8:05	0			4.91	18.9	444.2	1.33	239.4		= clear, slight sulphur odour, no CO2
8:08	0.6			5.21	19.6	396.8	0.52	198.7		
8:11	1.6			5.41	19.6	386.7	0.39	169.7		
8:15	2.5			5.49	19.7	383.8	0.35	152.1		
8:19	3.5			5.54	19.8	379.7	0.31	135.3		
8:22	4.5			5.55	19.8	380.5	0.30	130.7		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity	
Exceedances (Y/N):				Y	NA	N	NA	NA		

Analytes Sampled for:	Bottles Collected	QA/QC Information	Field Comments (bore condition, fate of tubing, redox correction etc.)
	x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic	x 60 mL Ferrous x 100 mL Amber x 60 mL metals (HNO ₃)	
Contingency Actions for Exceedances			
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.		Contingency Actions Taken: pH within baseline values Outside of/below guideline values	
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.			
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.			
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.			

Approval and Distribution						
	27/06/18					
Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Project Manager Signature	Date	Distribution: Project Central File


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		DI			
Depth to GW (m-pvc): 2.81	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:		SD/DS		
Bore Depth (m-pvc): 6.53	Casing Radius (mm):	Corrected Redox:	Y / (N)	<input type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	Sample Date:		27/06/18		PM Name:		Linda Kirchner
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole								
	Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
8:37	0		70%	5.24	18.5	526	2.99	121.1		clear, no colour, no odour	
8:40	1.5		↓	5.03	20.1	534	0.39	149.4			
8:43	2.0			5.03	20.2	524	0.38	149.8			
8:46	2.5			5.04	20.2	536	0.33	151.4			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y	NA	N	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: • tree roots detected on dipper. PH: below baseline & guideline values					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		27/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
Distribution: Project Central File											


Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.			Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 27/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: GW-T3E-A									
Depth to GW (m-pvc): 3.21	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:										
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump										
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)	<input checked="" type="checkbox"/> Other (specify)											
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole												
	Key Type (if applicable):	<input type="checkbox"/> Retrieved												
Sample Date: 27/06/18														
Project: Roe 8 Environmental Monitoring														
PM Name: Linda Kirchner														
Water Quality Parameters														
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity				
9:08	0		70%	7.52	18.8	677	2.16	-120.1		- slight sulphur odour, colourless & clear				
9:11	1.0		↓	5.00	19.6	693	0.44	-60.8		- sulphur odour, colourless & clear				
9:14	1.5		↓	4.81	19.6	691	0.35	-53.7						
9:17	2		↓	4.79	19.7	694	0.30	-54.5						
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity					
Exceedances (Y/N):				Y	NA	N	NA	NA						
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)						
		x 40 mL Vial (HCl)	x 60 mL Ferrous											
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber											
		x 250 mL Plastic	x 60 mL metals (HNO ₃)											
Contingency Actions for Exceedances														
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: pH: below baseline & guidelines								
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.														
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.														
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.														
Approval and Distribution														
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date		Distribution: Project Central File		
		27/06/18												

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>			
Date of GW Level: 27/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	Low Flow: Pump rate:		Surface Water: <input type="checkbox"/>		Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: GW-DS					
Depth to GW (m-pvc): 2.83	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: SD/DS									
Bore Depth (m-pvc): 5.89	Casing Radius (mm):	Corrected Redox: Y / <input checked="" type="checkbox"/> N	<input type="checkbox"/> Disposable	Peristaltic Pump											
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)												
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			Sample Date: 27/06/18		Project: Roe 8 Environmental Monitoring								
Key Type (if applicable):		<input type="checkbox"/> Retrieved					PM Name: Linda Kirchner								
Water Quality Parameters															
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity					
9:44	0	5.1	75 l	7.57	17.1	642	4.98	-33.5		initially brown, clear, some turbidity; sulphur odour					
9:47				5.43	18.3	805	1.79	-8.2							
9:50				4.84	18.5	840	0.78	10.8							
9:53				4.79	18.6	841	0.66	13.2							
9:56				4.79	18.7	836	0.52	11.8							
9:59				4.81	18.8	847	0.43	6.4							
10:02	5			4.83	18.8	846	0.40	1.5		then clear, colourless, no turbidity					
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity						
Exceedances (Y/N):				Y	NA	N	NA	NA							
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, fate of tubing, redox correction etc.)							
		x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic		x 60 mL Ferrous x 100 mL Amber x 60 mL metals (HNO ₃)											
Contingency Actions for Exceedances															
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>															
Contingency Actions Taken:															
pH: below baseline & g/lime															
Approval and Distribution															
Fieldwork Staff Signature: 		Date: 27/06/18		Checker Name and Signature: _____				Date: _____				Project Manager Signature: _____		Date: _____	
Distribution: Project Central File															

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.			Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level: 27/06/18	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	Low Flow: Pump rate:		Bore / Location ID: T3B						
Depth to GW (m-pvc): 1.71	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: SD/DS						
Bore Depth (m-pvc): 8.84	Casing Radius (mm):	Corrected Redox: Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Project: Roe 8 Environmental Monitoring						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date: 27/06/18		PM Name: Linda Kirchner						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole										
Key Type (if applicable):		<input type="checkbox"/> Retrieved										
Water Quality Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
11:23	0		70%	7.59	19.3	169.1	2.15	-63.8		• clear, colourless, odourless		
11:26	1		↓	6.09	20.1	152.4	0.52	-85.7				
11:29	1.5		↓	5.77	20.2	142.7	0.39	-68.0				
11:32	2		↓	5.63	20.2	142.2	0.34	-53.4				
11:35	2.5		100%	5.56	20.1	142.8	0.31	-44.1				
11:38	4			5.51	20.2	143.8	0.30	-38.4				
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				Y	NA	Y	NA	NA				
Analytes Sampled for:		Bottles Collected		QA/QC Information			Field Comments (bore condition, fate of tubing, redox correction etc.)					
		x 40 mL Vial (HCl)										
		x 40 mL Vial (H ₂ SO ₄)		x 60 mL Ferrous								
		x 250 mL Plastic		x 100 mL Amber								
		x 60 mL metals (HNO ₃)										
Contingency Actions for Exceedances												
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>						<p>Contingency Actions Taken: pH: within baseline, below guideline EC: below baseline</p>						
Approval and Distribution												
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date		
		27/06/18										
Distribution: Project Central File												

Groundwater/Surface Water Sampling and Purging Record

General Bore Information				Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		T4B			
Depth to GW (m-pvc): 0-85	Screen Interval (m):	Chem Kit Model:	YSI Rq DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:		SD/DS		
Bore Depth (m-pvc): 2-11	Casing Radius (mm):	Corrected Redox:	Y / (N)	<input checked="" type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input checked="" type="checkbox"/> Other (specify)	Sample Date:		27/06/18				
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	M Downhole	PM Name:		Linda Kirchner					
	Key Type (if applicable):		<input checked="" type="checkbox"/> Retrieved								
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DC (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
12:07	0			7.44	17.0	362.8	6.03	-14.7		• clear, colourless, odourless	
12:10				5.22	19.1	375.9	0.68	-47.4		• "	
12:13				4.95	19.2	377.2	0.38	-47.2		• "	
12:16				4.91	19.2	377.7	0.31	-49.3		• clear, colourless, strong sulphur odour	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% tu-bidity		
Exceedances (Y/N):				Y	NA	N	NA	NA			
Analytes Sampled for:		Bottles Collected		QA/QC Information				Field Comments (bore condition, rate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous					Rain heavy Bore location is submerged. ↑			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: • location of bore = wetland pH: below b/line & g/line * Ref. bore					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date	
		27/06/18									
Distribution: Project Central File											

Groundwater/Surface Water Sampling and Purging Record


General Bore Information		Parameter Info.		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID: T4C				
Depth to GW (m-pvc): 5.79	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: SD/DS			
Bore Depth (m-pvc): 10.89	Casing Radius (mm):	Corrected Redox:	Y / <u>N</u>	<input checked="" type="checkbox"/> Disposable	<input checked="" type="checkbox"/> Peristaltic Pump		Project: Roe 8 Environmental Monitoring			
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	Sample Date: 27/06/18		PM Name: Linda Kirchner			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole								
	Key Type (if applicable):	<input type="checkbox"/> Retrieved								
Water Quality Parameters										
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	<input checked="" type="checkbox"/> NFU	Odour, Colour, Turbidity
12:32	0		75%	5.46	20.1	451.9	0.72	-42.5		sulphur odour, colourless, clear.
12:35	1		↓	5.54	20.1	443.9	0.40	-63.1		
12:38	2		↓	5.56	20.1	440.9	0.33	-58.8		
12:41	3			5.56	20.1	440.4	0.30	-57.0		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity	
Exceedances (Y/N):				N	NA	N	NA	NA		
Analytes Sampled for:		Bottles Collected		QA/QC Information			Field Comments (bore condition, fate of tubing, redox correction etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous							
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber							
		x 250 mL Plastic	x 60 mL metals (HNO ₃)							
Contingency Actions for Exceedances										
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.										
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.					• Ref. bore					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.										
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.										
Approval and Distribution										
_____ Fieldwork Staff Signature		_____ 27/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date
Distribution: Project Central File										

Groundwater/Surface Water Sampling and Purging Record


Date of GW Level: 28/6/18		Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input checked="" type="checkbox"/> Decontaminated	<input checked="" type="checkbox"/> Low Flow: Pump rate:	Surface Water: <input type="checkbox"/>	Groundwater: <input checked="" type="checkbox"/>
Depth to GW (m-pvc): 9.68		Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:	Bore / Location ID: BH12	
Bore Depth (m-pvc): 17.50		Casing Radius (mm):	Corrected Redox: Y / 0	<input type="checkbox"/> Disposable	<input type="checkbox"/> Peristaltic Pump	Fieldwork Staff: DS/SD	
Depth to Product (m-pvc):		Cover Type (gate/slick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify):		Project: Roe 8 Environmental Monitoring	
Product Thickness (m):		Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole		Sample Date: 28/06/18	PM Name: Linda Kirchner	
		Key Type (if applicable):	<input type="checkbox"/> Retrieved				

Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	Do (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity
7:18	0			7.85	12.2	576	8.81	36.9		
7:21				7.23	14.3	589	7.51	53.0		clear, colourless, no turbidity, no odour
7:24				6.41	15.4	657	7.26	79.9		
7:27				5.84	16.3	729	7.20	106.6		
7:30				5.65	16.6	755	7.187	122.9		
7:33				5.57	16.7	763	7.21	133.5		
7:36	4			5.52	16.8	765	7.16	141.5		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity	
Exceedances (Y/N):				N	NA	N	NA	NA		

Contingency Actions for Exceedances		Contingency Actions Taken:	
<p>Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.</p> <p>Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.</p> <p>Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.</p> <p>pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.</p>	<p>x 40 mL Vial (HCl)</p> <p>x 40 mL Vial (H₂SO₄)</p> <p>x 250 mL Plastic</p> <p>x 90 mL Ferrous</p> <p>x 100 mL Amber</p> <p>x 60 mL metals (HNO₃)</p>	<p>Rinsate taken WQA03.</p>	<p>Ref. bore</p>

Approval and Distribution							
	28/06/18						
Fieldwork Staff Signature	Date	Checker Name and Signature	Date	Project Manager Signature	Date	Distribution: Project Central File	


Groundwater/Surface Water Sampling and Purging Record

General Bore Information			Recontamination		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		
Date of GW Level: 28/6	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>		Bore / Location ID: GW-D3				
Depth to GW (m-pvc): 4.08	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	<input checked="" type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff: SD/DS					
Bore Depth (m-pvc): 7.10	Casing Radius (mm):	Corrected Redox: Y / (N)	<input type="checkbox"/> Disposable	Peristaltic Pump		Project: Roe 8 Environmental Monitoring					
Depth to Product (m-pvc):	Cover Type (grip/stick up):	(The correction to apply is probe dependent)	<input type="checkbox"/> Other (specify)	Sample Date: 28/06/18		PM Name: Linda Kirchner					
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole	<input type="checkbox"/> Retrieved								
	Key Type (if applicable):										
Urgency Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
8:02	0			7.65	19	381.4	2.70	17.3		clear, colourless, no turbidity, no odour	
8:05				5.17	20.8	377.0	0.50	51.1			
8:08				5.11	20.9	367.1	0.42	70.1			
8:11				5.11	20.9	364.7	0.42	78.6			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y	NA	N	NA	NA			
Analytes Sampled:		Solids / Filtrate		pH / Turbidity				Other Parameters (e.g. temperature, conductivity, etc.)			
		x 40 mL Vial (HCl)	x 60 mL Ferrous								
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.											
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.						Contingency Actions Taken: pH: below b/line & g/line					
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		28/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Borehole Information				Parameter List		Decontamination		Sampling Method		Surface Water: <input checked="" type="checkbox"/> Groundwater: <input type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		BLNS-B1			
Depth to GW (m-pvc): 50cm	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:		SD/DS		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)	Sample Date:		PM Name:		Linda Kirchner		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Dew. mode								
	Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Data Collection - Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
9:00				7.77	13.9	1570	5.11	67.1	17.5	- low high turbidity colourness	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	N	NA	NA			
Analytical Sample Vials		Borehole Borehole		Borehole Information				Fieldwork Information			
		x 40 mL Vial (HCl)	x 60 mL Ferrous	WQA02-28-06-18 Duplicate				- water level has risen			
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
[Signature]		28/06/18									
Fieldwork Staff Signature		Date		Checker Name and Signature				Date			
				Project Manager Signature				Date			
Distribution: Project Control File											


Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Parameter		Decontamination		Sampling Method		Surface Water:		Groundwater:	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		<input checked="" type="checkbox"/>		A2S	
Depth to GW (m-pvc): 10cm	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:				
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 3 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			PM Name:		Linda Kirchner		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole	Sample Date:							
	Key Type (if applicable):	<input type="checkbox"/> Retrieved									
Water Quality Parameters											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp. °C	EC (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
8:55				8.00	13.9	1508	5.23	69.4	9.8	= clear/low turbidity	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	N	NA	NA			
Analytical Sample(s)		Bottles/Containers		Vial Information		Additional Comments (Flow direction, water table, etc.)					
		x 40 mL Vial (HCl)	x 60 mL Ferrous			* water level has risen * algae bloom / scum has disappeared.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		28/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Purging Information		Decontamination		Sampling Method		Surface Water		Groundwater		
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Surface Water:		<input checked="" type="checkbox"/>	<input type="checkbox"/>			
Depth to GW (m-pvc): 15cm	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Bore / Location ID:		A2			
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Fieldwork Staff:		SD/DS			
Depth to Product (m-pvc):	Cover Type (gate/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify):			Project:		Roe 8 Environmental Monitoring			
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input type="checkbox"/> Downhole	Sample Date:		28/06/18		PM Name:		Linda Kirchner		
	Key Type (if applicable):		<input type="checkbox"/> Retrieved									
Monitoring Parameters												
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	EC (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity		
9:17				8.15	14.4	1484	6.22	54.9	6.7	• medium turbidity • colourless / clear		
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity			
Exceedances (Y/N):				N	NA	Y	NA	NA				
Analyses Scheduled for:		Bore Information		Flow Information		Bore Construction Details (if applicable)						
		x 40 mL Vial (HCl)		x 60 mL Ferrous	• water level has risen • rained all day 27/06/18.							
		x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber								
		x 250 mL Plastic		x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances												
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: EC: below/baseline values.						
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.												
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bors within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bors.												
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.												
Approval and Distribution												
[Signature] 28/06/18 Fieldwork Staff Signature Date		_____ Checker Name and Signature Date		_____ Project Manager Signature Date		_____ Distribution: Project Central File						

Groundwater/Surface Water Sampling and Purging Record

General Bore Information		Reference Data		Decontamination		Sampling Method		Surface Water:		Groundwater:	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Surface Water:		<input checked="" type="checkbox"/>	Groundwater: <input type="checkbox"/>		
Depth to GW (m-pvc): 20cm	Screen Interval (m):	Chem Kit Model:	YSI Pro DSS	<input type="checkbox"/> Dedicated	Intake depth:		Bore / Location ID:		BL-Jetty		
Bore Depth (m-pvc):	Casing Radius (mm):	Corrected Redox:	Y / N	<input type="checkbox"/> Disposable	Peristaltic Pump		Fieldwork Staff:		DS/SD		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify)			Project:		Roe 8 Environmental Monitoring		
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	T/I Downhole			Sample Date:		28/06/18			
	Key Type (if applicable):		T/I Retrieved					PM Name:		Linda Kirchner	
X/GW/PH/DO/Redox/Temp/NTU/Colour/Turbidity											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp. °C	EC (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
9:23				8.01	14.5	1483	6.64	5.97	3.6	clear, colourless	
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	Y	NA	NA			
Analysis Sampling Info		Bore/Well/Borehead		Sampler/Instrument		Field Comments (Time, Location, Date, Time, Bore ID, etc.)					
		x 40 mL Vial (HCl)	x 60 mL Ferrous			water table has risen.					
		x 40 mL Vial (H ₂ SO ₄)	x 100 mL Amber								
		x 250 mL Plastic	x 60 mL metals (HNO ₃)								
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: EC: below b/lime values					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
 Fieldwork Staff Signature		28/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Central File	

Groundwater/Surface Water Sampling and Purging Record

Date of GW Level: 28/06		Bore Radius (mm):		Chem Kit Serial No.: 17H101156		Decontamination:		Sampling Method:		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Depth to GW (m-pvc): 10.47		Screen Interval (m):		Chem Kit Model: YSI Pro DSS		<input type="checkbox"/> Decontaminated <input type="checkbox"/> Dedicated <input type="checkbox"/> Disposable <input type="checkbox"/> Other (specify):		F1 Low Flow: Pump rate: Intake depth:		Bore / Location ID: Gw-DB	
Bore Depth (m-pvc): 11.78		Casing Radius (mm):		Corrected Redox: Y / N		(The correction to apply is probe dependent)		F1 Peristaltic Pump		Fieldwork Staff: SD/DS	
Depth to Product (m-pvc):		Cover Type (Cap/Stick up):		Parameter method: F1 Downhole				Sample Date: 28/06/18		Project: Roe 8 Environmental Monitoring	
Product Thickness (m):		Bore Locked (YES/NO):		Parameter method: F1 Retrieved						PM Name: Linda Kirchner	
Key Type (if applicable):											
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	E.C. (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
10:04	0			8.37	17.3	291.5	3.40	-33.4		Clear, colourless, no	
10:07	↓			6.93	18.8	291.5	2.22	-85.0			
10:10	↓			6.41	19.4	294.1	2.30	-81.5		turbidity, no odour	
10:13	↓			6.27	19.7	290.6	2.40	-76.2			
10:16	3			6.23	19.8	289.4	2.45	-73.6			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				Y	NA	N	NA	NA			
Contingency Actions for Exceedances		Bottles / Containers		Decontamination		Reference Bore(s) (Name, Location, Date, Time, and Depth)					
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.		x 40 mL Vial (HCl) x 40 mL Vial (H ₂ SO ₄) x 250 mL Plastic		x 60 mL Ferrous x 100 mL Amber x 60 mL metals (HNO ₃)							
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.								Contingency Actions Taken: pH: above b/line & below g/line			
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution:											
_____ Fieldwork Staff Signature		28/06/18 Date		_____ Checker Name and Signature		_____ Date		_____ Project Manager Signature		_____ Date	
										Distribution: Project Control File	

Groundwater/Surface Water Sampling and Purging Record

General Information		Purging Details		Decontamination		Sampling Method		Surface Water		Groundwater	
Date of GW Level: 26/6	Bore Radius (mm):	Chem Kit Serial No.: 17H101156	FI Decontaminated	FI Low Flow: Pump rate:	<input type="checkbox"/> Surface Water		<input type="checkbox"/> Groundwater		<input checked="" type="checkbox"/>		
Depth to GW (m-pvc): 0.30m	Screen Interval (m):	Chem Kit Model: YSI Pro DSS	FI Dedicated	Intake depth:	Bore / Location ID: GW-D4						
Bore Depth (m-pvc): 3.89	Casing Radius (mm):	Corrected Redox: Y / O	FI Disposable	Peristaltic Pump	Fieldwork Staff: DS/SD						
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)	FI Other (specify):	Sample Date: 28/06/18	Project: Roe 8 Environmental Monitoring						
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method: <input checked="" type="checkbox"/> Downhole			PM Name: Linda Kirchner						
	Key Type (if applicable):	<input checked="" type="checkbox"/> Retrieved									
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	EC (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
10:44	0			8.30	16.8	274.7	5.82	11.5		initial turbidity, clear,	
10:47				6.62	17.0	271.8	4.61	38.7			
10:50				6.06	17.1	272.9	4.52	51.5		light brown, no odour	
10:53				5.91	17.2	274.0	4.56	59.1			
10:56				5.34	17.3	274.2	4.61	61.6			
10:59				5.83	17.5	274.4	4.59	62.1			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	N	NA	NA			
Vials/Containers		SCUBA/Boiler		Other/Other		Other/Other		Other/Other		Other/Other	
x 40 mL Vial (HCl)		x 60 mL Ferrous									
x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber									
x 250 mL Plastic		x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken:					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date	
		28/06/18									
Distribution: Project Central File											

Groundwater/Surface Water Sampling and Purging Record

General/Bore Information				Parameter(s)		Decontamination		Sampling Method		Surface Water: <input type="checkbox"/> Groundwater: <input checked="" type="checkbox"/>	
Date of GW Level:	Bore Radius (mm):	Chem Kit Serial No.:	17H101156	<input checked="" type="checkbox"/> Decontaminated	<input type="checkbox"/> Low Flow: Pump rate:	Bore / Location ID:		B410			
Depth to GW (m-pvc): 1.53	Screen Interval (m):	Chem Kit Model:	YSI Eco DSS	<input type="checkbox"/> Dedicated	Intake depth:		Fieldwork Staff:		SD/DS		
Bore Depth (m-pvc): 5.65	Casing Radius (mm):	Corrected Redox:	Y / N	<input checked="" type="checkbox"/> Disposable	Peristaltic Pump		Project:		Roe 8 Environmental Monitoring		
Depth to Product (m-pvc):	Cover Type (gatic/stick up):	(The correction to apply is probe dependent)		<input type="checkbox"/> Other (specify):	Sample Date:		28/06/18		PM Name:		Linda Kirchner
Product Thickness (m):	Bore Locked (YES/NO):	Parameter method:	<input checked="" type="checkbox"/> Downhole								
	Key Type (if applicable):		<input type="checkbox"/> Retrieved								
Time	Cumulative Vol. Removed (L)	SWL (m-pvc)	Pump Rate	pH	Temp °C	EC (mS/cm or µS/cm)	DO (ppm or mg/L)	Redox (mV)	NTU	Odour, Colour, Turbidity	
11:18	0		75%	6.01	19.5	185.1	0.97	66.4		= light brown, no odour, medium turbidity	
11:21	1.5		↓	5.33	19.8	180.8	0.50	105.3			
11:24	2.5			5.22	19.7	178.6	0.43	117.5			
11:27	3.5			5.21	19.6	178.8	0.44	118.3			
Acceptable Stabilised Parameter Range for Sampling:				± 0.05	± 0.2 °C	± 3%	± 10%	± 10 mV	± 10% turbidity		
Exceedances (Y/N):				N	NA	Y	NA	NA			
Reference Sampling Vials		Bore(s) Reference		Other (if applicable)		Other (if applicable)					
x 40 mL Vial (HCl)		x 60 mL Ferrous									
x 40 mL Vial (H ₂ SO ₄)		x 100 mL Amber									
x 250 mL Plastic		x 60 mL metals (HNO ₃)									
Contingency Actions for Exceedances											
Surface Water Quality: Resample affected location within four weeks of original sampling event. Contact PM and refer to DMMP and WMMP for further instructions.						Contingency Actions Taken: EC: below b/time values					
Groundwater Levels: If bore is dry determine reason why (low groundwater, blocked bore). Determine cause for rapid change in groundwater level. Contact PM.											
Groundwater Quality: Determine if reference bore water quality also exceeds trigger values, range and guidelines. Resample affected bore within four weeks of original sampling event. Contact PM for further instructions if both rounds exceed trigger values and concentrations are 20% higher than reference bores.											
pH (Surface Water and Groundwater): Measure pH daily for seven days to ensure recording is not an anomaly. Determine if reference groundwater bore water quality also exceeds targets. Contact PM.											
Approval and Distribution											
Fieldwork Staff Signature		Date		Checker Name and Signature		Date		Project Manager Signature		Date	
		28/06/18								Distribution: Project Central File	

Appendix C: Laboratory Documentation



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1705812

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MS FRANCESCA FLYNN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: francesca.flynn@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 01-Jun-2017 17:15	Issue Date	: 08-Jun-2017
Client Requested Due Date	: 13-Jun-2017	Scheduled Reporting Date	: 13-Jun-2017

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not intact.
No. of coolers/boxes	: 3	Temperature	: -1.0 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 13 / 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **VOC EP080 analysis will be conducted by ALS Melbourne, NATA accreditation No. 825, Site No. 13778.**
- **Chl a analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1705754

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: michelle.orourke@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: 6432 2000	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 31-May-2017 16:10	Issue Date	: 01-Jun-2017
Client Requested Due Date	: 08-Jun-2017	Scheduled Reporting Date	: 08-Jun-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Intact.
No. of coolers/boxes	: 1	Temperature	: 5.9 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 7

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1706873

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: chris.mcgraghan@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: TIM WILLIAMSON		

Dates

Date Samples Received	: 28-Jun-2017 14:40	Issue Date	: 28-Jun-2017
Client Requested Due Date	: 05-Jul-2017	Scheduled Reporting Date	: 05-Jul-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not intact.
No. of coolers/boxes	: 2	Temperature	: 2.4 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **Chlorophyll analysis will be conducted by ALS Environmental, Sydney, NATA accreditation no. 825, Site No. 10911.**
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1706851

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: chris.mcgraghan@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 27-Jun-2017 16:30	Issue Date	: 28-Jun-2017
Client Requested Due Date	: 04-Jul-2017	Scheduled Reporting Date	: 03-Jul-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 8.8 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 12 / 12

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1707992

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: michelle.orourke@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: 6432 2000	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 26-Jul-2017 16:50	Issue Date	: 26-Jul-2017
Client Requested Due Date	: 01-Aug-2017	Scheduled Reporting Date	: 01-Aug-2017

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 18.5 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 11 / 11

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG020T Total Recoverable Metals by ICPMS (including	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
EP1707992-001	26-Jul-2017 00:00	GW-D3_260717	✓		✓	✓	
EP1707992-002	26-Jul-2017 00:00	GW-D4_260717	✓		✓	✓	
EP1707992-003	26-Jul-2017 00:00	GW-D7_260717	✓		✓	✓	
EP1707992-004	26-Jul-2017 00:00	GW-D8_260717	✓		✓	✓	
EP1707992-005	26-Jul-2017 00:00	T3B_260717	✓		✓	✓	
EP1707992-006	26-Jul-2017 00:00	T3C_260717	✓		✓	✓	
EP1707992-007	26-Jul-2017 00:00	T4B_260717	✓		✓	✓	
EP1707992-008	26-Jul-2017 00:00	BH10_260717	✓		✓	✓	
EP1707992-009	26-Jul-2017 00:00	WQA01_260717	✓		✓	✓	
EP1707992-010	26-Jul-2017 00:00	WQA03_260717		✓		✓	
EP1707992-011	26-Jul-2017 00:00	WQA04_LR TBW701					✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)

Email

AP_CustomerService.ANZ@aecom.com

MICHELLE OROURKE

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1708050

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: michelle.orourke@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: 6432 2000	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: TIM WILLIAMSON		

Dates

Date Samples Received	: 27-Jul-2017 17:30	Issue Date	: 28-Jul-2017
Client Requested Due Date	: 07-Aug-2017	Scheduled Reporting Date	: 07-Aug-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 3	Temperature	: 2.3 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 15 / 15

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1709130

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: chris.mcgraghan@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 23-Aug-2017 18:00	Issue Date	: 24-Aug-2017
Client Requested Due Date	: 31-Aug-2017	Scheduled Reporting Date	: 31-Aug-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Intact.
No. of coolers/boxes	: 2	Temperature	: 17.3 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 17 / 17

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG020T Total Recoverable Metals by ICPMS (including Chlorophyll a	WATER - EP008 Chlorophyll a	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
EP1709130-001	23-Aug-2017 00:00	BLNS-B1_230817	✓	✓	✓	✓	✓	
EP1709130-002	23-Aug-2017 00:00	A2_230817	✓	✓	✓	✓	✓	
EP1709130-003	23-Aug-2017 00:00	A2S_230817	✓	✓	✓	✓	✓	
EP1709130-004	23-Aug-2017 00:00	NLWS-N2_230817	✓	✓	✓	✓	✓	
EP1709130-005	23-Aug-2017 00:00	A1_230817	✓	✓	✓	✓	✓	
EP1709130-006	23-Aug-2017 00:00	A1N_230817	✓	✓	✓	✓	✓	
EP1709130-007	23-Aug-2017 00:00	FS2_230817	✓	✓	✓	✓	✓	
EP1709130-008	23-Aug-2017 00:00	FS4A_230817	✓	✓	✓	✓	✓	
EP1709130-009	23-Aug-2017 00:00	RD1_230817	✓	✓	✓	✓	✓	
EP1709130-010	23-Aug-2017 00:00	RD1A_230817	✓	✓	✓	✓	✓	
EP1709130-011	23-Aug-2017 00:00	S1_230817	✓	✓	✓	✓	✓	
EP1709130-012	23-Aug-2017 00:00	A3_230817	✓	✓	✓	✓	✓	
EP1709130-013	23-Aug-2017 00:00	WQA02_230817	✓	✓	✓	✓	✓	
EP1709130-014	23-Aug-2017 00:00	DBTBW780_230817						✓
EP1709130-015	23-Aug-2017 00:00	AIE_230817	✓	✓	✓	✓	✓	
EP1709130-016	23-Aug-2017 00:00	D1_230817	✓			✓	✓	
EP1709130-017	23-Aug-2017 00:00	D2_230817	✓			✓	✓	

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)

Email

AP_CustomerService.ANZ@aecom.com

CHRIS MCGRAGHAN

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1709182

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: chris.mcgraghan@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60475410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 24-Aug-2017 18:00	Issue Date	: 24-Aug-2017
Client Requested Due Date	: 31-Aug-2017	Scheduled Reporting Date	: 31-Aug-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 16.8 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 13 / 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- **Volatile Organic Compound analysis may be compromised as sample containers contained headspace.**
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1709224

Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: chris.mcgraghan@aecom.com	E-mail	: ShukHui.Li@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: 60478410	Page	: 1 of 2
Order number	: 60478410-2.06	Quote number	: EP2016AECOMAU0013 (EP/1136/16 V2)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Tim Williamson		

Dates

Date Samples Received	: 25-Aug-2017 12:15	Issue Date	: 25-Aug-2017
Client Requested Due Date	: 31-Aug-2017	Scheduled Reporting Date	: 31-Aug-2017

Delivery Details

Mode of Delivery	: Client Drop Off	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 21.3 - Ice Bricks present
Receipt Detail	:	No. of samples received / analysed	: 3 / 3

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (14 days), Solid (60 days) from date of completion of Work Order.
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICPMS	WATER - EG020T Total Recoverable Metals by ICPMS (including	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRHBTEXN
EP1709224-001	25-Aug-2017 00:00	GW-D4_	✓		✓	✓
EP1709224-002	25-Aug-2017 00:00	T4C_	✓		✓	✓
EP1709224-003	25-Aug-2017 00:00	WQA03_		✓		✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

ACCOUNTS PAYABLE

- A4 - AU Tax Invoice (INV)

Email

AP_CustomerService.ANZ@aecom.com

CHRIS MCGRAGHAN

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)
- EDI Format - ENMRG (ENMRG)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

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SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1712990

Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: timothy.williamson@mrialliance.com.au	E-mail	: Brandon.Ovens@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: MRIA - R8 Rehab	Page	: 1 of 3
Order number	: W81020-103	Quote number	: EP2017MRIAJV0001 (EP/840/17)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Rachel Champion		

Dates

Date Samples Received	: 17-Nov-2017 17:02	Issue Date	: 17-Nov-2017
Client Requested Due Date	: 24-Nov-2017	Scheduled Reporting Date	: 24-Nov-2017

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 2	Temperature	: 9.0 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 14 / 14

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **ORC METALS analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818.**
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EP008 Chlorophyll a	WATER - MRIA 3.03 Dissolved Metals Suite	WATER - MRIA 4.03 Total Metals Suite	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
EP1712990-001	17-Nov-2017 00:00	D1		✓		✓	✓	
EP1712990-002	17-Nov-2017 00:00	D2		✓		✓	✓	
EP1712990-003	17-Nov-2017 00:00	T2F		✓		✓	✓	
EP1712990-004	17-Nov-2017 00:00	GW-T3E-A		✓		✓	✓	
EP1712990-005	17-Nov-2017 00:00	GW-D3		✓		✓	✓	
EP1712990-006	17-Nov-2017 00:00	GW-D4		✓		✓	✓	
EP1712990-007	17-Nov-2017 00:00	GW-D5		✓		✓	✓	
EP1712990-008	17-Nov-2017 00:00	T3B		✓		✓	✓	
EP1712990-009	17-Nov-2017 00:00	T4B		✓		✓	✓	
EP1712990-010	17-Nov-2017 00:00	WQA02_151117	✓	✓	✓	✓	✓	
EP1712990-011	17-Nov-2017 00:00	BLNS-B1	✓	✓	✓	✓	✓	
EP1712990-012	17-Nov-2017 00:00	A2	✓	✓	✓	✓	✓	
EP1712990-013	17-Nov-2017 00:00	A2S	✓	✓	✓	✓	✓	
EP1712990-014	17-Nov-2017 00:00	WQA05_DB TBW 1132						✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

Brandon Ovens

- A4 - AU Tax Invoice (INV) Email brandon.ovens@alsglobal.com
- Chain of Custody (CoC) (COC) Email brandon.ovens@alsglobal.com

Lauren Biagioni

- A4 - AU Tax Invoice (INV) Email lauren.biagioni@alsglobal.com

Rachel Champion

- *AU Certificate of Analysis - NATA (COA) Email rachel.champion@mrialliance.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email rachel.champion@mrialliance.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email rachel.champion@mrialliance.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email rachel.champion@mrialliance.com.au
- Chain of Custody (CoC) (COC) Email rachel.champion@mrialliance.com.au
- EDI Format - ESDAT (ESDAT) Email rachel.champion@mrialliance.com.au
- EDI Format - XTab (XTAB) Email rachel.champion@mrialliance.com.au

Tim Williamson

- *AU Certificate of Analysis - NATA (COA) Email timothy.williamson@mrialliance.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email timothy.williamson@mrialliance.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email timothy.williamson@mrialliance.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email timothy.williamson@mrialliance.com.au
- Chain of Custody (CoC) (COC) Email timothy.williamson@mrialliance.com.au
- EDI Format - ESDAT (ESDAT) Email timothy.williamson@mrialliance.com.au
- EDI Format - XTab (XTAB) Email timothy.williamson@mrialliance.com.au



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1713111

Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
E-mail	: timothy.williamson@mrialliance.com.au	E-mail	: Brandon.Ovens@alsglobal.com
Telephone	: ----	Telephone	: 08 9209 7655
Facsimile	: ----	Facsimile	: +61-8-9209 7600
Project	: MRIA - R8 Rehab	Page	: 1 of 3
Order number	: W81020-103	Quote number	: EP2017MRIAJV0001 (EP/840/17)
C-O-C number	: ----	QC Level	: NEPM 2013 B3 & ALS QC Standard
Site	: ----		
Sampler	: Rachel Champion		

Dates

Date Samples Received	: 21-Nov-2017 16:45	Issue Date	: 21-Nov-2017
Client Requested Due Date	: 28-Nov-2017	Scheduled Reporting Date	: 28-Nov-2017

Delivery Details

Mode of Delivery	: Carrier	Security Seal	: Not Available
No. of coolers/boxes	: 1	Temperature	: 8.1 - Ice present
Receipt Detail	:	No. of samples received / analysed	: 8 / 8

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **ORC METALS analysis will be conducted by ALS Environmental, Brisbane, NATA accreditation no. 825, Site No. 818.**
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - MRIA 3.03 Dissolved Metals Suite	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN	WATER - W-18 TRH(C6 - C9)/BTEXN
EP1713111-001	20-Nov-2017 00:00	BH10	✓	✓	✓	
EP1713111-002	20-Nov-2017 00:00	T3C	✓	✓	✓	
EP1713111-003	20-Nov-2017 00:00	GW-D7	✓	✓	✓	
EP1713111-004	20-Nov-2017 00:00	GW-D8	✓	✓	✓	
EP1713111-005	21-Nov-2017 00:00	T4C	✓	✓	✓	
EP1713111-006	21-Nov-2017 00:00	BH12	✓	✓	✓	
EP1713111-007	20-Nov-2017 00:00	WQA01_201117	✓	✓	✓	
EP1713111-008	20-Nov-2017 00:00	WQA06_DB TBW 1133				✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.



Requested Deliverables

Brandon Ovens

- A4 - AU Tax Invoice (INV) Email brandon.ovens@alsglobal.com
- Chain of Custody (CoC) (COC) Email brandon.ovens@alsglobal.com

Lauren Biagioni

- A4 - AU Tax Invoice (INV) Email lauren.biagioni@alsglobal.com

Rachel Champion

- *AU Certificate of Analysis - NATA (COA) Email rachel.champion@mrialliance.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email rachel.champion@mrialliance.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email rachel.champion@mrialliance.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email rachel.champion@mrialliance.com.au
- Chain of Custody (CoC) (COC) Email rachel.champion@mrialliance.com.au
- EDI Format - ESDAT (ESDAT) Email rachel.champion@mrialliance.com.au
- EDI Format - XTab (XTAB) Email rachel.champion@mrialliance.com.au

Tim Williamson

- *AU Certificate of Analysis - NATA (COA) Email timothy.williamson@mrialliance.com.au
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI) Email timothy.williamson@mrialliance.com.au
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email timothy.williamson@mrialliance.com.au
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email timothy.williamson@mrialliance.com.au
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- EDI Format - ESDAT (ESDAT) Email timothy.williamson@mrialliance.com.au
- EDI Format - XTab (XTAB) Email timothy.williamson@mrialliance.com.au



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1806776
Amendment : 1

Client : MRIA
Contact : Chris McGraghan
Address : 202 Pier Street
Perth, Western Australia 6000

Laboratory : Environmental Division Perth
Contact : Brandon Ovens
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail : chris.mcgraghan@aecom.com
Telephone : ----
Facsimile : ----

E-mail : Brandon.Ovens@alsglobal.com
Telephone : 08 9406 1328
Facsimile : +61-8-9406 1399

Project : 60478410
Order number : W81020-103
C-O-C number : ----
Site : ----
Sampler : Tim Williamson

Page : 1 of 2
Quote number : EP2017MRIAJV0001 (EP/840/17)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 01-Jun-2018 17:10
Client Requested Due : 11-Jun-2018
Date

Issue Date : 12-Jun-2018
Scheduled Reporting Date : 11-Jun-2018

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 1
Receipt Detail :

Security Seal : Not Available
Temperature : -1.1 - Ice present
No. of samples received / analysed : 13 / 13

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

Method Client sample ID	Sample Container Received	Preferred Sample Container for Analysis
TRH Volatiles/BTEX : EP080		
WQA03_01_06_18	- Amber Glass Bottle - Unpreserved	- Amber VOC Vial - Sulfuric Acid

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - EG020T Total Metals by ICP/MS (including digestion)	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN
EP1806776-001	01-Jun-2018 09:00	GW-D3_01_06_18	✓		✓	✓
EP1806776-002	01-Jun-2018 09:50	GW-D4_01_06_18	✓		✓	✓
EP1806776-003	01-Jun-2018 00:00	GW-D5_01_06_18	✓		✓	✓
EP1806776-004	01-Jun-2018 10:45	GW-D8_01_06_18	✓		✓	✓
EP1806776-005	01-Jun-2018 12:50	T3B_01_06_18	✓		✓	✓
EP1806776-006	01-Jun-2018 13:45	T3C_01_06_18	✓		✓	✓
EP1806776-007	01-Jun-2018 13:16	BH10_01_06_18	✓		✓	✓
EP1806776-008	01-Jun-2018 08:04	BH12_01_06_18	✓		✓	✓
EP1806776-009	01-Jun-2018 14:41	GW-T3E-A_01_06_18	✓		✓	✓
EP1806776-010	01-Jun-2018 00:00	WQA01_01_06_18	✓		✓	✓
EP1806776-011	01-Jun-2018 00:00	WQA03_01_06_18		✓		✓
EP1806776-012	01-Jun-2018 11:49	D1_01_06_18	✓		✓	✓
EP1806776-013	01-Jun-2018 11:20	D2_01_06_18	✓		✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Brandon Ovens

- A4 - AU Tax Invoice (INV)
- Chain of Custody (CoC) (COC)

Email brandon.ovens@alsglobal.com
Email brandon.ovens@alsglobal.com

Chris McGraghan

- *AU Certificate of Analysis - NATA (COA)
- *AU Interpretive QC Report - DEFAULT (Anon QCI Rep) (QCI)
- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC)
- A4 - AU Sample Receipt Notification - Environmental HT (SRN)
- Chain of Custody (CoC) (COC)
- EDI Format - ESDAT (ESDAT)
- EDI Format - XTab (XTAB)

Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com
Email chris.mcgraghan@aecom.com

Klinton Breese

- A4 - AU Tax Invoice (INV)

Email Klinton.Breese@mrialliance.com.au

Lauren Biagioni

- A4 - AU Tax Invoice (INV)

Email lauren.biagioni@alsglobal.com



SAMPLE RECEIPT NOTIFICATION (SRN)

Work Order : EP1806725
Amendment : 1

Client : MRIA
Contact : Chris McGraghan
Address : 202 Pier Street
Perth, Western Australia 6000

E-mail : chris.mcgraghan@aecom.com
Telephone : ----
Facsimile : ----

Project : 60478410
Order number : W81020-103
C-O-C number : ----
Site : ----
Sampler : Tim Williamson

Laboratory : Environmental Division Perth
Contact : Brandon Ovens
Address : 26 Rigali Way Wangara WA Australia
6065

E-mail : Brandon.Ovens@alsglobal.com
Telephone : 08 9406 1328
Facsimile : +61-8-9406 1399

Page : 1 of 2
Quote number : EP2017MRIAJV0001 (EP/840/17)
QC Level : NEPM 2013 B3 & ALS QC Standard

Dates

Date Samples Received : 31-May-2018 17:20
Client Requested Due : 11-Jun-2018
Date

Issue Date : 13-Jun-2018
Scheduled Reporting Date : 11-Jun-2018

Delivery Details

Mode of Delivery : Carrier
No. of coolers/boxes : 1
Receipt Detail :

Security Seal : Intact.
Temperature : 10.0 - Ice present
No. of samples received / analysed : 2 / 2

General Comments

- This report contains the following information:
 - Sample Container(s)/Preservation Non-Compliances
 - Summary of Sample(s) and Requested Analysis
 - Proactive Holding Time Report
 - Requested Deliverables
- Please see scanned COC for sample discrepancies: extra samples , samples not received etc.
- Please direct any queries related to sample condition / numbering / breakages to Sample Receipt (SamplesPerth@alsenviro.com)
- Analytical work for this work order will be conducted at ALS Environmental Perth.
- Please direct any turnaround / technical queries to the laboratory contact designated above.
- Sample Disposal - Aqueous (3 weeks), Solid (2 months) from receipt of samples.
- **pH analysis should be conducted within 6 hours of sampling.**



Sample Container(s)/Preservation Non-Compliances

All comparisons are made against pretreatment/preservation AS, APHA, USEPA standards.

- **No sample container / preservation non-compliance exists.**

Summary of Sample(s) and Requested Analysis

Some items described below may be part of a laboratory process necessary for the execution of client requested tasks. Packages may contain additional analyses, such as the determination of moisture content and preparation tasks, that are included in the package.

If no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component

Matrix: **WATER**

Laboratory sample ID	Client sampling date / time	Client sample ID	WATER - EG020F Dissolved Metals by ICP/MS	WATER - NT-08A Total Nitrogen + NO2 + NO3 + NH3 + Total P +	WATER - W-04 TRH/BTEXN
EP1806725-001	31-May-2018 09:28	T4B_31_05_18	✓	✓	✓
EP1806725-002	31-May-2018 10:07	T4C_31_05_18	✓	✓	✓

Proactive Holding Time Report

Sample(s) have been received within the recommended holding times for the requested analysis.

Requested Deliverables

Brandon Ovens

- A4 - AU Tax Invoice (INV) Email brandon.ovens@alsglobal.com
- Chain of Custody (CoC) (COC) Email brandon.ovens@alsglobal.com

Chris McGraghan

- *AU Certificate of Analysis - NATA (COA) Email chris.mcgraghan@aecom.com
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- *AU QC Report - DEFAULT (Anon QC Rep) - NATA (QC) Email chris.mcgraghan@aecom.com
- A4 - AU Sample Receipt Notification - Environmental HT (SRN) Email chris.mcgraghan@aecom.com
- Chain of Custody (CoC) (COC) Email chris.mcgraghan@aecom.com
- EDI Format - ESDAT (ESDAT) Email chris.mcgraghan@aecom.com
- EDI Format - XTab (XTAB) Email chris.mcgraghan@aecom.com

Klinton Breese

- A4 - AU Tax Invoice (INV) Email Klinton.Breese@mrialliance.com.au

Lauren Biagioni

- A4 - AU Tax Invoice (INV) Email lauren.biagioni@alsglobal.com

CERTIFICATE OF ANALYSIS

Work Order : **EP1706873**
Client : **AECOM Australia Pty Ltd**
Contact : **MR CHRIS MCGRAGHAN**
Address : **LEVEL 6 3 FORREST PLACE**
PERTH WA, AUSTRALIA 6849

Telephone : **----**
Project : **60478410**
Order number : **60478410-2.06**
C-O-C number : **----**
Sampler : **TIM WILLIAMSON**
Site : **----**
Quote number : **EP/1136/16 V2**
No. of samples received : **8**
No. of samples analysed : **8**

Page : 1 of 9
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 28-Jun-2017 14:40
Date Analysis Commenced : 28-Jun-2017
Issue Date : 05-Jul-2017 17:23



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Chlorophyll analysis conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_	T3C_	BH10_	BLNS-B1_	A2_
Client sampling date / time				28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1706873-001	EP1706873-002	EP1706873-003	EP1706873-004	EP1706873-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	<0.01	0.10	0.02	0.03	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.005	0.019	0.006	0.013	0.008	
Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.003	<0.001	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.57	1.58	0.64	0.14	0.16	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.04	0.10	
Arsenic	7440-38-2	0.001	mg/L	----	----	----	0.002	0.002	
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	0.003	
Copper	7440-50-8	0.001	mg/L	----	----	----	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	----	----	----	<0.001	0.001	
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.024	0.076	
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	0.002	
Selenium	7782-49-2	0.01	mg/L	----	----	----	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	----	----	----	0.28	0.61	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.06	0.04	0.02	0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	<0.01	0.27	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.01	0.27	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.7	2.9	4.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_	T3C_	BH10_	BLNS-B1_	A2_
Client sampling date / time				28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1706873-001	EP1706873-002	EP1706873-003	EP1706873-004	EP1706873-005	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	0.2	0.2	1.0	2.9	4.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.04	0.01	0.04	0.07	0.29	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	<0.01	0.02	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	----	----	----	4	5	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	83.8	82.9	90.7	79.4	70.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_	T3C_	BH10_	BLNS-B1_	A2_
Client sampling date / time					28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00
Compound	CAS Number	LOR	Unit		EP1706873-001	EP1706873-002	EP1706873-003	EP1706873-004	EP1706873-005
					Result	Result	Result	Result	Result
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%		105	103	99.7	118	103
4-Bromofluorobenzene	460-00-4	2	%		122	122	109	120	118



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2S_	WQA02_280617	DB TBW 575	----	----
Client sampling date / time				28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1706873-006	EP1706873-007	EP1706873-008	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.012	0.013	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.14	0.14	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.026	0.024	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.28	0.32	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.02	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.6	2.5	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2S_	WQA02_280617	DB TBW 575	----	----
Client sampling date / time				28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1706873-006	EP1706873-007	EP1706873-008	-----	-----	
				Result	Result	Result	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	2.6	2.5	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.07	0.12	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	3	2	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	84.0	76.0	90.3	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2S_	WQA02_280617	DB TBW 575	----	----
Client sampling date / time				28-Jun-2017 00:00	28-Jun-2017 00:00	28-Jun-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1706873-006	EP1706873-007	EP1706873-008	-----	-----	
				Result	Result	Result	----	----	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	104	105	88.0	----	----	
4-Bromofluorobenzene	460-00-4	2	%	123	103	116	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1706851
Client : AECOM Australia Pty Ltd
Contact : MR CHRIS MCGRAGHAN
Address : LEVEL 6 3 FORREST PLACE
 PERTH WA, AUSTRALIA 6849

Telephone : ----
Project : 60478410
Order number : 60478410-2.06
C-O-C number : ----
Sampler : Tim Williamson
Site : ----
Quote number : EP/1136/16 V2
No. of samples received : 12
No. of samples analysed : 12

Page : 1 of 9
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 27-Jun-2017 16:30
Date Analysis Commenced : 28-Jun-2017
Issue Date : 03-Jul-2017 16:43



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_	GW-D4_	GW-D5_	GW-D7_	GW-D8_
Client sampling date / time				27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1706851-001	EP1706851-002	EP1706851-003	EP1706851-004	EP1706851-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.06	0.38	0.01	0.17	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	0.009	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.001	0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.006	<0.001	0.002	0.109	0.009	
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.001	0.002	0.044	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	0.021	
Iron	7439-89-6	0.05	mg/L	0.76	<0.05	0.94	4.42	0.30	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	<0.01	0.16	0.35	0.22	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.11	3.00	0.01	0.02	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.11	3.00	0.01	0.02	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.6	0.6	2.5	0.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.3	3.6	0.6	2.5	0.8	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.06	0.03	0.49	0.14	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.42	0.12	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_	GW-D4_	GW-D5_	GW-D7_	GW-D8_
Client sampling date / time					27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00
Compound	CAS Number	LOR	Unit	EP1706851-001	EP1706851-002	EP1706851-003	EP1706851-004	EP1706851-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	94.6	92.0	88.4	89.3	91.9	
Toluene-D8	2037-26-5	2	%	102	101	87.9	89.4	91.9	
4-Bromofluorobenzene	460-00-4	2	%	98.8	98.4	91.4	91.7	94.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T2F_	T4B_	T4C_	GW-T3E-A	WQA01_270617
Client sampling date / time				27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1706851-006	EP1706851-007	EP1706851-008	EP1706851-009	EP1706851-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.23	0.02	0.36	0.17	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.058	0.006	0.007	0.008	0.009	
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.002	<0.001	0.043	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	0.022	
Iron	7439-89-6	0.05	mg/L	1.77	0.12	4.34	0.41	0.31	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.38	0.89	0.17	0.42	0.22	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	1.2	0.3	1.5	0.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	1.2	0.3	1.5	0.8	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.03	0.28	0.02	0.16	0.15	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.26	<0.01	0.05	0.13	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T2F_	T4B_	T4C_	GW-T3E-A	WQA01_270617
Client sampling date / time				27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	27-Jun-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1706851-006	EP1706851-007	EP1706851-008	EP1706851-009	EP1706851-010	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	93.2	93.4	93.0	91.4	89.9	
Toluene-D8	2037-26-5	2	%	93.5	95.5	93.1	91.4	89.2	
4-Bromofluorobenzene	460-00-4	2	%	96.8	98.6	96.2	93.7	93.5	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA03_270617	WQA04_DB TBW 576	----	----	----
Client sampling date / time				27-Jun-2017 00:00	27-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EP1706851-011	EP1706851-012	-----	-----	-----	
				Result	Result	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA03_270617	WQA04_DB TBW 576	----	----	----
Client sampling date / time				27-Jun-2017 00:00	27-Jun-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EP1706851-011	EP1706851-012	-----	-----	-----	
				Result	Result	----	----	----	
EP080: BTEXN - Continued									
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	84.9	86.3	----	----	----	
Toluene-D8	2037-26-5	2	%	87.2	88.2	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	87.2	89.3	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1708050**
Client : **AECOM Australia Pty Ltd**
Contact : MICHELLE OROURKE
Address : LEVEL 6 3 FORREST PLACE
 PERTH WA, AUSTRALIA 6849
Telephone : 6432 2000
Project : 60478410
Order number : 60478410-2.06
C-O-C number : ----
Sampler : TIM WILLIAMSON
Site : ----
Quote number : EP/1136/16 V2
No. of samples received : 15
No. of samples analysed : 15

Page : 1 of 11
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090
Telephone : 08 9209 7655
Date Samples Received : 27-Jul-2017 17:30
Date Analysis Commenced : 28-Jul-2017
Issue Date : 07-Aug-2017 17:09



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- EK061G/EK067G (TKN/TP): LOR raised for sample 'BH12_270717' due to possible sample matrix interference.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5_270717	T2F_270717	T3C_270717	BH12_270717	GW-T3E-A_270717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-001	EP1708050-002	EP1708050-003	EP1708050-004	EP1708050-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.82	0.03	0.02	<0.01	0.29	
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.003	<0.001	<0.001	<0.001	0.001	
Copper	7440-50-8	0.001	mg/L	0.003	<0.001	0.003	0.002	0.003	
Lead	7439-92-1	0.001	mg/L	0.002	<0.001	0.001	<0.001	0.002	
Manganese	7439-96-5	0.001	mg/L	0.003	0.065	0.008	0.005	0.006	
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.002	0.008	0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	0.031	<0.005	0.024	0.042	0.029	
Iron	7439-89-6	0.05	mg/L	2.07	1.84	3.84	<0.05	0.36	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.11	0.46	0.20	0.02	0.32	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	4.99	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	4.99	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.7	0.3	0.8	0.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.9	0.7	0.3	5.8	0.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.03	0.01	<0.01	<0.02	0.08	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.01	<0.01	<0.01	0.07	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5_270717	T2F_270717	T3C_270717	BH12_270717	GW-T3E-A_270717
Client sampling date / time					27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00
Compound	CAS Number	LOR	Unit	EP1708050-001	EP1708050-002	EP1708050-003	EP1708050-004	EP1708050-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	87.2	90.1	91.4	90.0	92.2	
Toluene-D8	2037-26-5	2	%	100	99.6	99.8	99.8	96.9	
4-Bromofluorobenzene	460-00-4	2	%	92.5	92.1	92.4	90.4	91.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_270717	A2_270717	A2S_270717	NLWS-N2_270717	A1_270717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-006	EP1708050-007	EP1708050-008	EP1708050-009	EP1708050-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	0.04	0.03	1.40	1.18	
Arsenic	7440-38-2	0.001	mg/L	0.001	0.002	0.001	0.001	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0002	0.0002	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.002	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	0.004	0.003	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	0.012	0.010	
Manganese	7439-96-5	0.001	mg/L	0.021	0.012	0.020	0.818	0.801	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.008	0.007	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.073	0.080	
Iron	7439-89-6	0.05	mg/L	0.24	0.24	0.24	9.97	8.73	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.08	0.14	0.07	1.37	1.19	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.002	0.001	0.004	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	0.0002	0.0002	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.003	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	0.004	0.006	
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	0.012	0.015	
Manganese	7439-96-5	0.001	mg/L	0.023	0.033	0.022	0.736	0.738	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.009	0.008	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.071	0.074	
Iron	7439-89-6	0.05	mg/L	0.45	0.68	0.39	11.0	15.7	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.33	0.37	0.36	0.08	0.10	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.03	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.05	0.06	0.05	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.08	0.09	0.08	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.1	2.5	2.3	1.6	3.0	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_270717	A2_270717	A2S_270717	NLWS-N2_270717	A1_270717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-006	EP1708050-007	EP1708050-008	EP1708050-009	EP1708050-010	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	2.2	2.6	2.4	1.6	3.0	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.17	0.09	0.04	0.32	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.04	0.04	<0.01	0.02	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	6	10	4	11	44	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	98.6	92.5	95.7	94.7	90.5	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_270717	A2_270717	A2S_270717	NLWS-N2_270717	A1_270717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-006	EP1708050-007	EP1708050-008	EP1708050-009	EP1708050-010	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	98.0	101	101	102	103	
4-Bromofluorobenzene	460-00-4	2	%	88.4	88.1	88.0	88.0	85.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FS2_270717	RD1_270717	S1_270717	WQA02_270717	WQA05_LRTBW700_2 70717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00
Compound	CAS Number	LOR	Unit	EP1708050-011	EP1708050-012	EP1708050-013	EP1708050-014	EP1708050-015	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.49	0.24	0.22	0.04	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	0.001	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.002	0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.014	0.018	0.026	0.021	----	
Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	<0.001	<0.001	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
Zinc	7440-66-6	0.005	mg/L	0.011	0.009	0.005	0.009	----	
Iron	7439-89-6	0.05	mg/L	1.00	0.73	0.40	0.24	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.53	2.96	0.21	0.08	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	0.001	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.002	0.010	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	0.001	0.046	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	0.002	0.055	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.013	0.045	0.023	0.023	----	
Nickel	7440-02-0	0.001	mg/L	0.002	0.005	0.001	<0.001	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
Zinc	7440-66-6	0.005	mg/L	0.012	0.314	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	1.13	4.07	0.39	0.45	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.21	0.07	0.35	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	<0.01	0.03	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.03	<0.01	0.05	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.04	<0.01	0.08	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	3.6	1.7	2.3	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FS2_270717	RD1_270717	S1_270717	WQA02_270717	WQA05_LRTBW700_2 70717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-011	EP1708050-012	EP1708050-013	EP1708050-014	EP1708050-015	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	1.8	3.6	1.7	2.4	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.94	0.13	0.09	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.69	0.07	0.04	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	2	6	1	5	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	140	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	240	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	380	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	300	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	160	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	460	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	5	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	5	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	93.9	93.2	93.0	92.6	97.0	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FS2_270717	RD1_270717	S1_270717	WQA02_270717	WQA05_LRTBW700_2 70717
Client sampling date / time				27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	27-Jul-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1708050-011	EP1708050-012	EP1708050-013	EP1708050-014	EP1708050-015	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	101	100	102	102	99.8	
4-Bromofluorobenzene	460-00-4	2	%	86.7	87.3	86.3	87.4	86.9	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1709130**
Client : **AECOM Australia Pty Ltd**
Contact : **MR CHRIS MCGRAGHAN**
Address : **LEVEL 6 3 FORREST PLACE**
PERTH WA, AUSTRALIA 6849

Telephone : **----**
Project : **60478410**
Order number : **60478410-2.06**
C-O-C number : **----**
Sampler : **Tim Williamson**
Site : **----**
Quote number : **EP/1136/16 V2**
No. of samples received : **17**
No. of samples analysed : **17**

Page : 1 of 14
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 23-Aug-2017 18:00
Date Analysis Commenced : 24-Aug-2017
Issue Date : 30-Aug-2017 21:24



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- It is recognised that some total metals (EG020T) are less than dissolved metals (ED020F) for various samples. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_230817	A2_230817	A2S_230817	NLWS-N2_230817	A1_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709130-001	EP1709130-002	EP1709130-003	EP1709130-004	EP1709130-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.06	0.04	0.04	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.002	0.004	0.003	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.033	0.028	0.031	1.09	1.16	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.008	0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.27	0.26	0.31	11.1	15.0	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.06	0.06	0.10	0.08	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.004	0.005	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.002	
Copper	7440-50-8	0.001	mg/L	<0.001	0.001	<0.001	0.002	0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.002	
Manganese	7439-96-5	0.001	mg/L	0.032	0.030	0.032	1.12	1.14	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.005	<0.005	0.014	0.010	
Iron	7439-89-6	0.05	mg/L	0.48	0.44	0.55	18.6	19.4	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.70	0.61	0.67	0.10	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.09	0.10	0.09	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.23	0.23	0.21	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.32	0.33	0.30	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.1	2.0	2.1	6.4	3.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_230817	A2_230817	A2S_230817	NLWS-N2_230817	A1_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709130-001	EP1709130-002	EP1709130-003	EP1709130-004	EP1709130-005	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	2.4	2.3	2.4	6.4	3.8	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.19	0.18	0.20	2.03	1.12	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.12	0.12	0.12	1.10	0.41	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	2	3	3	19	95	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	100	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	170	470	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	370	660	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	540	1230	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	120	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	460	970	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	160	260	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	620	1350	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	120	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	97.7	99.1	102	100	101	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_230817	A2_230817	A2S_230817	NLWS-N2_230817	A1_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	EP1709130-001	EP1709130-002	EP1709130-003	EP1709130-004	EP1709130-005	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	105	107	104	107	107	
4-Bromofluorobenzene	460-00-4	2	%	99.4	99.3	96.3	96.8	96.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1N_230817	FS2_230817	FS4A_230817	RD1_230817	RD1A_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	EP1709130-006	EP1709130-007	EP1709130-008	EP1709130-009	EP1709130-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.33	0.32	0.25	0.27	
Arsenic	7440-38-2	0.001	mg/L	0.003	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.001	0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.777	0.035	0.038	0.017	0.016	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.001	<0.001	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.006	0.008	
Iron	7439-89-6	0.05	mg/L	0.69	1.07	1.01	0.62	0.63	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.09	0.40	0.37	0.92	0.31	
Arsenic	7440-38-2	0.001	mg/L	0.004	<0.001	<0.001	0.002	0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.004	0.002	
Copper	7440-50-8	0.001	mg/L	<0.001	0.001	<0.001	0.014	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	0.013	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.777	0.034	0.050	0.024	0.015	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.001	0.002	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.007	0.008	0.098	0.009	
Iron	7439-89-6	0.05	mg/L	3.37	1.67	1.56	1.60	0.86	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	0.08	0.07	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.10	0.06	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	0.10	0.06	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.9	1.4	1.5	2.2	1.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1N_230817	FS2_230817	FS4A_230817	RD1_230817	RD1A_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709130-006	EP1709130-007	EP1709130-008	EP1709130-009	EP1709130-010	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	2.9	1.4	1.5	2.3	1.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.98	0.16	0.16	0.81	0.75	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.85	0.03	0.03	0.69	0.68	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	10	<1	3	5	<1	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	140	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	700	<50	<50	120	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	840	<50	<50	120	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	110	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	700	<100	<100	150	<100	
>C34 - C40 Fraction	----	100	µg/L	210	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	1020	<100	<100	150	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	110	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	102	105	103	101	106	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1N_230817	FS2_230817	FS4A_230817	RD1_230817	RD1A_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	EP1709130-006	EP1709130-007	EP1709130-008	EP1709130-009	EP1709130-010	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	107	105	104	106	104	
4-Bromofluorobenzene	460-00-4	2	%	95.9	97.6	97.3	96.3	97.4	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S1_230817	A3_230817	WQA02_230817	DBTBW780_230817	AIE_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709130-011	EP1709130-012	EP1709130-013	EP1709130-014	EP1709130-015	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.14	0.26	0.04	----	0.04	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	0.002	----	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	<0.001	----	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.020	0.036	0.032	----	0.554	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	----	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.005	<0.005	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.41	0.75	0.26	----	0.23	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.17	0.33	0.05	----	0.05	
Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.002	----	0.003	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.001	0.002	<0.001	----	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.022	0.038	0.034	----	0.539	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	----	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01	
Zinc	7440-66-6	0.005	mg/L	0.008	0.010	<0.005	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.59	1.09	0.48	----	2.67	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.02	0.69	----	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.09	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	0.22	----	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.31	----	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.5	2.0	----	2.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S1_230817	A3_230817	WQA02_230817	DBTBW780_230817	AIE_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709130-011	EP1709130-012	EP1709130-013	EP1709130-014	EP1709130-015	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	1.2	1.5	2.3	----	2.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.22	0.12	0.18	----	1.38	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.11	<0.01	0.12	----	1.23	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	<1	<1	1	----	9	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	140	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	420	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	560	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	420	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	140	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	560	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	104	102	98.8	104	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	S1_230817	A3_230817	WQA02_230817	DBTBW780_230817	AIE_230817
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00	23-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	EP1709130-011	EP1709130-012	EP1709130-013	EP1709130-014	EP1709130-015	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	106	106	105	106	106	
4-Bromofluorobenzene	460-00-4	2	%	97.1	95.0	98.8	97.6	93.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		D1_230817	D2_230817	----	----	----
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EP1709130-016	EP1709130-017	-----	-----	-----	-----	-----
				Result	Result	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS										
Aluminium	7429-90-5	0.01	mg/L	0.26	0.27	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	0.004	0.010	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	0.001	0.003	----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.003	0.003	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.029	0.047	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.05	0.09	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser										
Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.04	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser										
Nitrite as N	14797-65-0	0.01	mg/L	0.02	<0.01	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser										
Nitrate as N	14797-55-8	0.01	mg/L	1.46	0.19	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser										
Nitrite + Nitrate as N	----	0.01	mg/L	1.48	0.19	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser										
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.9	----	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser										
^ Total Nitrogen as N	----	0.1	mg/L	1.8	1.1	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser										
Total Phosphorus as P	----	0.01	mg/L	0.02	0.07	----	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser										
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons										
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1_230817	D2_230817	----	----	----
Client sampling date / time				23-Aug-2017 00:00	23-Aug-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EP1709130-016	EP1709130-017	-----	-----	-----	
				Result	Result	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	
[^] Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----	
[^] Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	101	98.6	----	----	----	
Toluene-D8	2037-26-5	2	%	104	105	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	97.9	96.9	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1709182**
Client : **AECOM Australia Pty Ltd**
Contact : **MR CHRIS MCGRAGHAN**
Address : **LEVEL 6 3 FORREST PLACE**
PERTH WA, AUSTRALIA 6849

Telephone : **----**
Project : **60478410**
Order number : **60475410-2.06**
C-O-C number : **----**
Sampler : **Tim Williamson**
Site : **----**
Quote number : **EP/1136/16 V2**
No. of samples received : **13**
No. of samples analysed : **13**

Page : 1 of 9
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 24-Aug-2017 18:00
Date Analysis Commenced : 24-Aug-2017
Issue Date : 30-Aug-2017 17:11



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EP080: Sample EP1709182-008 is positive for TRH C6-C9 fraction due to compounds other than BTEXN.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_	GW-D5_	GW-D7_	GW-D8_	T2F_
Client sampling date / time				24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709182-001	EP1709182-002	EP1709182-003	EP1709182-004	EP1709182-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.56	0.01	0.14	0.03	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	0.005	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	<0.001	0.002	<0.001	
Copper	7440-50-8	0.001	mg/L	0.004	0.008	0.004	<0.001	0.005	
Lead	7439-92-1	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.004	0.003	0.034	0.009	0.066	
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.002	0.024	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	0.027	0.042	0.020	0.343	0.035	
Iron	7439-89-6	0.05	mg/L	0.27	1.18	1.57	2.82	1.87	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.14	0.14	0.18	0.39	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.05	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	1.36	<0.01	4.61	0.06	0.03	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	1.36	<0.01	4.66	0.06	0.03	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.7	1.7	0.7	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.8	0.7	6.4	0.8	0.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.08	0.04	0.28	0.08	0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.26	0.04	0.02	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_	GW-D5_	GW-D7_	GW-D8_	T2F_
Client sampling date / time					24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00
Compound	CAS Number	LOR	Unit	EP1709182-001	EP1709182-002	EP1709182-003	EP1709182-004	EP1709182-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	114	107	110	108	112	
Toluene-D8	2037-26-5	2	%	102	83.6	101	101	97.4	
4-Bromofluorobenzene	460-00-4	2	%	116	113	118	113	118	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_	T3C_	T4B_	BH10_	BH12_
Client sampling date / time				24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1709182-006	EP1709182-007	EP1709182-008	EP1709182-009	EP1709182-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	<0.01	0.24	1.28	<0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.002	0.002	0.019	
Lead	7439-92-1	0.001	mg/L	0.001	0.001	<0.001	<0.001	0.002	
Manganese	7439-96-5	0.001	mg/L	0.004	0.012	0.008	0.007	0.003	
Nickel	7440-02-0	0.001	mg/L	0.001	0.008	0.001	0.001	0.025	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	0.029	0.029	0.024	<0.005	0.322	
Iron	7439-89-6	0.05	mg/L	0.61	0.96	0.17	1.62	<0.05	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.06	0.77	0.09	0.02	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	<0.01	0.01	0.86	5.45	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	0.01	0.86	5.45	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.1	1.4	3.2	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.1	0.1	1.4	4.1	6.0	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.29	0.14	0.06	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.28	0.10	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	30	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_	T3C_	T4B_	BH10_	BH12_
Client sampling date / time					24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00
Compound	CAS Number	LOR	Unit		EP1709182-006	EP1709182-007	EP1709182-008	EP1709182-009	EP1709182-010
					Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	117	108	116	112	
Toluene-D8	2037-26-5	2	%	98.1	105	101	107	98.5	
4-Bromofluorobenzene	460-00-4	2	%	114	117	115	117	115	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		GW-T3E-A	WQA01_240817	WQA06_DBTBW779 TBW 779	----	----
Client sampling date / time				24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	----	----
Compound	CAS Number	LOR	Unit	EP1709182-011	EP1709182-012	EP1709182-013	-----	-----
				Result	Result	Result	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.64	<0.01	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.005	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	0.002	0.002	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.006	0.033	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.001	0.001	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.030	<0.005	----	----	----
Iron	7439-89-6	0.05	mg/L	0.60	1.48	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.31	0.15	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.06	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.01	4.69	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	4.75	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	1.8	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.7	6.6	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.05	0.30	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.27	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	WQA01_240817	WQA06_DBTBW779 TBW 779	----	----
Client sampling date / time				24-Aug-2017 00:00	24-Aug-2017 00:00	24-Aug-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1709182-011	EP1709182-012	EP1709182-013	-----	-----	
				Result	Result	Result	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
[^] Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	121	107	106	----	----	
Toluene-D8	2037-26-5	2	%	101	84.1	103	----	----	
4-Bromofluorobenzene	460-00-4	2	%	114	116	115	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1709224**
Client : **AECOM Australia Pty Ltd**
Contact : **MR CHRIS MCGRAGHAN**
Address : **LEVEL 6 3 FORREST PLACE**
PERTH WA, AUSTRALIA 6849

Telephone : **----**
Project : **60478410**
Order number : **60478410-2.06**
C-O-C number : **----**
Sampler : **Tim Williamson**
Site : **----**
Quote number : **EP/1136/16 V2**
No. of samples received : **3**
No. of samples analysed : **3**

Page : 1 of 5
Laboratory : Environmental Division Perth
Contact : ShukHui Li
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 25-Aug-2017 12:15
Date Analysis Commenced : 25-Aug-2017
Issue Date : 31-Aug-2017 17:00



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4_	T4C_	WQA03_	----	----
Client sampling date / time				25-Aug-2017 00:00	25-Aug-2017 00:00	25-Aug-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1709224-001	EP1709224-002	EP1709224-003	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.02	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.008	0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	0.001	<0.001	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.001	0.007	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.001	0.001	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.032	0.023	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	3.85	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	<0.01	----	----	
Arsenic	7440-38-2	0.001	mg/L	----	----	<0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----	
Copper	7440-50-8	0.001	mg/L	----	----	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	----	----	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	----	----	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----	
Selenium	7782-49-2	0.01	mg/L	----	----	<0.01	----	----	
Zinc	7440-66-6	0.005	mg/L	----	----	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	----	<0.05	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.19	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	2.22	0.02	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	2.22	0.02	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.3	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4_	T4C_	WQA03_	----	----
Client sampling date / time				25-Aug-2017 00:00	25-Aug-2017 00:00	25-Aug-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1709224-001	EP1709224-002	EP1709224-003	-----	-----	
				Result	Result	Result	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	3.1	0.3	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.08	<0.01	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	108	108	108	----	----	
Toluene-D8	2037-26-5	2	%	100	99.7	101	----	----	
4-Bromofluorobenzene	460-00-4	2	%	95.2	94.3	93.1	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1710701**
Client : **MRIA**
Contact : Tim Williamson
Address : 202 Pier Street
 Perth, Western Australia 6000

Telephone : ----
Project : MRIA - R8 Rehab
Order number : W81020-103
C-O-C number : ----
Sampler : Tim Williamson
Site : ----
Quote number : EP/840/17
No. of samples received : 11
No. of samples analysed : 11

Page : 1 of 8
Laboratory : Environmental Division Perth
Contact : Brandon Ovens
Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655
Date Samples Received : 28-Sep-2017 21:30
Date Analysis Commenced : 28-Sep-2017
Issue Date : 04-Oct-2017 15:54



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Brisbane, NATA Site No. 818.
- Ultra Trace metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				D1	D2	BH10	T3B	T3C
Client sampling date / time				27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00
Compound	CAS Number	LOR	Unit	EP1710701-001	EP1710701-002	EP1710701-003	EP1710701-004	EP1710701-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.09	0.29	0.95	0.02	0.08
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	0.001	<0.001	<0.001
Copper	7440-50-8	0.001	mg/L	0.004	0.005	0.002	<0.001	0.008
Lead	7439-92-1	0.001	mg/L	0.002	0.004	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.003	0.002	0.006	0.003	0.013
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.002	<0.001	0.002
Zinc	7440-66-6	0.005	mg/L	0.025	0.032	0.008	<0.005	0.026
Iron	7439-89-6	0.05	mg/L	0.28	0.06	2.55	0.59	1.21
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.6	<0.2	<0.2
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.06	0.24	0.05	0.07
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.03	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.68	0.05	0.06	0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.71	0.05	0.06	0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.9	3.3	0.1	0.3
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	0.9	1.0	3.4	0.1	0.3
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.19	0.02	0.02
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.19	<0.01	<0.01
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	BH10	T3B	T3C
Client sampling date / time					27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00
Compound	CAS Number	LOR	Unit	EP1710701-001	EP1710701-002	EP1710701-003	EP1710701-004	EP1710701-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	102	104	104	107	109	
Toluene-D8	2037-26-5	2	%	103	103	98.1	104	104	
4-Bromofluorobenzene	460-00-4	2	%	108	97.9	102	101	100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T4B	T4C	GW-D4	GW-D7	WQA01_260917
Client sampling date / time				27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710701-006	EP1710701-007	EP1710701-008	EP1710701-009	EP1710701-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.21	0.03	0.04	0.01	0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.001	
Copper	7440-50-8	0.001	mg/L	0.001	0.004	0.029	0.009	0.003	
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	0.002	0.002	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.006	0.008	0.002	0.004	0.004	
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.001	0.002	0.001	
Zinc	7440-66-6	0.005	mg/L	0.009	0.011	0.032	0.031	<0.005	
Iron	7439-89-6	0.05	mg/L	0.11	4.31	<0.05	<0.05	<0.05	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.4	<0.2	1.2	<0.2	<0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.91	0.20	0.01	0.01	0.03	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	0.02	0.02	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	0.02	3.14	17.8	17.5	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.02	3.14	17.8	17.5	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	0.3	0.7	3.5	3.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.3	0.3	3.8	21.3	20.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.24	<0.01	0.04	0.19	0.20	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.24	<0.01	<0.01	0.19	0.19	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T4B	T4C	GW-D4	GW-D7	WQA01_260917
Client sampling date / time				27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	27-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710701-006	EP1710701-007	EP1710701-008	EP1710701-009	EP1710701-010	
				Result	Result	Result	Result	Result	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	109	111	113	111	
Toluene-D8	2037-26-5	2	%	104	105	101	101	103	
4-Bromofluorobenzene	460-00-4	2	%	100	101	99.2	98.7	101	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			WQA06_DB TBW 869	----	----	----	----
Client sampling date / time		27-Sep-2017 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1710701-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	----	----	----	----	
Toluene-D8	2037-26-5	2	%	101	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	95.9	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1710595**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA - R8 Rehab

Order number : W81020-103

C-O-C number : ----

Sampler : Tim Williamson

Site : ----

Quote number : EP/840/17

No. of samples received : 11

No. of samples analysed : 11

Page : 1 of 8

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 26-Sep-2017 17:50

Date Analysis Commenced : 26-Sep-2017

Issue Date : 04-Oct-2017 12:23



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Brisbane, NATA Site No. 818.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D5	T2F	GW-T3E-A	A1E
Client sampling date / time				26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710595-001	EP1710595-002	EP1710595-003	EP1710595-004	EP1710595-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.68	0.04	0.48	0.06	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	<0.001	<0.001	0.004	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	<0.001	<0.001	0.002	
Copper	7440-50-8	0.001	mg/L	0.010	<0.001	<0.001	0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.005	0.003	0.044	0.006	0.331	
Nickel	7440-02-0	0.001	mg/L	0.003	0.002	0.001	0.002	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.009	0.006	<0.005	0.006	<0.005	
Iron	7439-89-6	0.05	mg/L	0.34	1.39	1.47	0.46	2.37	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	----	0.17	
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	----	----	----	----	0.002	
Manganese	7439-96-5	0.001	mg/L	----	----	----	----	0.384	
Nickel	7440-02-0	0.001	mg/L	----	----	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	----	----	----	----	0.008	
Iron	7439-89-6	0.05	mg/L	----	----	----	----	3.90	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.5	<0.2	<0.2	<0.2	<0.2	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	----	----	----	----	0.3	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.07	0.34	0.33	0.21	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.72	<0.01	0.03	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.72	<0.01	0.03	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	1.0	0.7	0.7	5.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.9	1.0	0.7	0.7	5.1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D5	T2F	GW-T3E-A	A1E
Client sampling date / time				26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710595-001	EP1710595-002	EP1710595-003	EP1710595-004	EP1710595-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.04	0.03	0.07	1.48	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.02	0.05	1.06	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	----	----	----	----	10	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	50	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	250	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	250	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	40	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	310	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	110	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	420	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	17	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	17	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	104	107	114	103	98.1	
Toluene-D8	2037-26-5	2	%	97.6	96.7	94.6	98.6	103	
4-Bromofluorobenzene	460-00-4	2	%	83.7	95.1	88.1	93.6	84.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1N	A1	NLWS-N2	A3	S1
Client sampling date / time				26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710595-006	EP1710595-007	EP1710595-008	EP1710595-009	EP1710595-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.07	0.07	0.24	0.11	
Arsenic	7440-38-2	0.001	mg/L	0.003	0.004	0.004	0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.342	0.452	0.450	0.032	0.022	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	0.009	0.006	0.006	
Iron	7439-89-6	0.05	mg/L	2.18	0.58	1.06	0.98	0.50	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.12	0.10	0.09	0.46	0.18	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.002	0.001	
Manganese	7439-96-5	0.001	mg/L	0.390	0.514	0.498	0.042	0.031	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	0.002	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.005	0.012	0.008	0.018	0.007	
Iron	7439-89-6	0.05	mg/L	2.68	2.18	1.88	1.47	0.64	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	0.2	0.2	<0.2	<0.2	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.4	0.3	0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.09	0.08	<0.01	0.05	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.5	4.6	4.2	3.7	1.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.5	4.6	4.2	3.7	1.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1N	A1	NLWS-N2	A3	S1
Client sampling date / time				26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	26-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710595-006	EP1710595-007	EP1710595-008	EP1710595-009	EP1710595-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.42	1.55	1.48	0.19	0.17	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.06	1.30	1.29	0.01	0.11	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	24	19	6	2	<1	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	30	70	60	20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	170	140	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	110	120	<100	<100	
C29 - C36 Fraction	----	50	µg/L	260	260	280	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	260	540	540	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	30	40	40	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	30	30	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	160	140	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	300	330	360	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	300	490	500	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	160	140	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	18	9	9	9	3	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	18	9	9	9	3	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	100	105	115	103	102	
Toluene-D8	2037-26-5	2	%	102	99.6	96.4	101	101	
4-Bromofluorobenzene	460-00-4	2	%	83.7	85.0	87.7	83.9	83.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			WQA05_BD TBW 868	----	----	----	----
Client sampling date / time		26-Sep-2017 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1710595-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	100	----	----	----	----	
Toluene-D8	2037-26-5	2	%	102	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	81.9	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1710522**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Tim Williamson

Site : ----

Quote number : EP/840/17

No. of samples received : 2

No. of samples analysed : 2

Page : 1 of 5

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 22-Sep-2017 17:40

Date Analysis Commenced : 22-Sep-2017

Issue Date : 03-Oct-2017 12:55



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Panda	Graduate Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals analyses by ICPMS and ORC-ICPMS conducted by ALS Brisbane, NATA Site No. 818.
- EG094-T (Total Metals in Fresh Water by ORC-ICPMS): LORs for EG094 have been raised due to client request.
- EG094-F (Dissolved Metals in Fresh Water by ORC-ICPMS): LORs for EG094 have been raised due to client request.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID			BH12	GW-D8	----	----	----
Client sampling date / time				22-Sep-2017 00:00	22-Sep-2017 00:00	----	----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1710522-001	EP1710522-002	-----	-----	-----	-----	-----	
				Result	Result	----	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS											
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.08	----	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.007	<0.001	----	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	0.002	<0.001	----	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.001	0.008	----	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.002	0.005	----	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.038	<0.005	----	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	1.25	----	----	----	----	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS											
Selenium	7782-49-2	0.2	µg/L	0.4	0.3	----	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.18	----	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser											
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	14797-55-8	0.01	mg/L	6.62	0.28	----	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser											
Nitrite + Nitrate as N	----	0.01	mg/L	6.62	0.28	----	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser											
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.1	0.7	----	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser											
^ Total Nitrogen as N	----	0.1	mg/L	7.7	1.0	----	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser											
Total Phosphorus as P	----	0.01	mg/L	0.05	0.05	----	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser											
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.03	----	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		BH12	GW-D8	----	----	----
Client sampling date / time		22-Sep-2017 00:00		22-Sep-2017 00:00		----	----	----
Compound	CAS Number	LOR	Unit	EP1710522-001	EP1710522-002	-----	-----	-----
				Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	101	102	----	----	----
Toluene-D8	2037-26-5	2	%	108	90.5	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	94.8	85.5	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1710339**
Client : **MRIA**
Contact : Tim Williamson
Address : 202 Pier Street
 Perth, Western Australia 6000
Telephone : ----
Project : MRIA - R8 Water Monitoring
Order number : W81020-103
C-O-C number : ----
Sampler : Tim Williamson
Site : ----
Quote number : EP/840/17
No. of samples received : 8
No. of samples analysed : 8

Page : 1 of 7
Laboratory : Environmental Division Perth
Contact : Brandon Ovens
Address : 10 Hod Way Malaga WA Australia 6090
Telephone : 08 9209 7655
Date Samples Received : 19-Sep-2017 17:30
Date Analysis Commenced : 20-Sep-2017
Issue Date : 27-Sep-2017 16:08



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When no sampling time is provided, the sampling time will default 00:00 on the date of sampling. If no sampling date is provided, the sampling date will be assumed by the laboratory and displayed in brackets without a time component.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals analysis conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG020 : It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- EG093: All samples were run on EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	A2S	FS2	FS4A
Client sampling date / time				19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710339-001	EP1710339-002	EP1710339-003	EP1710339-004	EP1710339-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.02	0.24	0.24	
Arsenic	7440-38-2	0.001	mg/L	0.001	0.002	0.002	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.041	0.037	0.040	0.030	0.029	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.013	0.008	0.006	<0.005	
Iron	7439-89-6	0.05	mg/L	0.27	0.30	0.28	1.29	1.26	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.05	0.08	0.31	0.48	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.002	
Manganese	7439-96-5	0.001	mg/L	0.043	0.044	0.046	0.050	0.041	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.002	0.002	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.030	0.006	0.005	0.010	
Iron	7439-89-6	0.05	mg/L	0.39	0.40	0.44	1.55	1.99	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.47	0.48	0.47	<0.01	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.08	0.08	0.08	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.29	0.24	0.28	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.37	0.32	0.36	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.4	2.6	2.5	2.0	4.9	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.8	2.9	2.9	2.0	4.9	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	A2S	FS2	FS4A
Client sampling date / time				19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1710339-001	EP1710339-002	EP1710339-003	EP1710339-004	EP1710339-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.24	0.25	0.24	0.16	0.37	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.23	0.22	0.22	0.04	0.04	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	2	2	4	<1	<1	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	110	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	110	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	96.7	93.7	95.4	93.4	95.9	
Toluene-D8	2037-26-5	2	%	99.5	100	100	101	101	
4-Bromofluorobenzene	460-00-4	2	%	88.2	89.8	84.9	84.9	84.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RD1	RD1A	WQA02_190917	----	----
Client sampling date / time				19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1710339-006	EP1710339-007	EP1710339-008	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.18	0.17	0.02	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.008	0.010	0.040	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	0.005	0.006	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	0.41	0.41	0.29	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.39	2.37	0.04	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	0.001	0.007	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.017	0.031	0.042	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.003	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	0.022	0.126	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	0.66	5.17	0.39	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.09	0.46	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.03	0.09	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.18	0.08	0.26	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.20	0.11	0.35	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	3.7	2.3	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.8	3.8	2.6	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	RD1	RD1A	WQA02_190917	----	----
Client sampling date / time				19-Sep-2017 00:00	19-Sep-2017 00:00	19-Sep-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1710339-006	EP1710339-007	EP1710339-008	-----	-----	
				Result	Result	Result	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.21	0.61	0.25	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.15	0.12	0.22	----	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	3	23	3	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	100	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	350	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	260	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	710	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	120	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	490	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	130	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	740	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	120	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	98.8	101	95.6	----	----	
Toluene-D8	2037-26-5	2	%	99.4	99.3	101	----	----	
4-Bromofluorobenzene	460-00-4	2	%	87.7	84.6	83.6	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
<i>Compound</i>	<i>CAS Number</i>	<i>Low</i>	<i>High</i>
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1711669**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 13

No. of samples analysed : 13

Page : 1 of 9

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 19-Oct-2017 17:20

Date Analysis Commenced : 19-Oct-2017

Issue Date : 26-Oct-2017 17:06



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Brisbane, NATA Site No. 818.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2	A2S	BLNS-B1	WQA02_171017	T4C
Client sampling date / time					18-Oct-2017 00:00	18-Oct-2017 00:00	18-Oct-2017 00:00	18-Oct-2017 00:00	19-Oct-2017 00:00
Compound	CAS Number	LOR	Unit	EP1711669-001	EP1711669-002	EP1711669-003	EP1711669-004	EP1711669-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.02	0.02	0.02	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.002	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.012	0.024	0.025	0.025	0.007	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.005	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.23	0.23	0.24	0.24	3.78	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.03	0.04	0.04	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.022	0.028	0.027	0.028	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.30	0.30	0.31	0.31	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	0.2	0.3	<0.2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.13	0.15	0.16	0.16	0.19	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.03	0.04	0.03	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.18	0.18	0.18	0.19	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.22	0.21	0.22	0.22	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	1.4	1.5	1.4	0.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.8	1.6	1.7	1.6	0.3	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2	A2S	BLNS-B1	WQA02_171017	T4C
Client sampling date / time				18-Oct-2017 00:00	18-Oct-2017 00:00	18-Oct-2017 00:00	18-Oct-2017 00:00	19-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711669-001	EP1711669-002	EP1711669-003	EP1711669-004	EP1711669-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.23	0.23	0.24	0.24	0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.20	0.20	0.20	0.20	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	2	2	3	3	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	99.1	103	102	104	103	
Toluene-D8	2037-26-5	2	%	85.6	86.6	86.2	83.9	86.4	
4-Bromofluorobenzene	460-00-4	2	%	90.1	90.7	86.4	85.9	85.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	T2F	GW-D5	T3B	BH10
Client sampling date / time				19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711669-006	EP1711669-007	EP1711669-008	EP1711669-009	EP1711669-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.55	0.05	0.69	0.37	1.15	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.003	<0.001	0.002	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.006	0.049	<0.001	0.003	0.006	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.002	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.37	2.15	0.36	0.54	3.70	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.3	<0.2	1.0	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.38	0.38	0.05	0.09	0.28	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	0.02	0.01	0.01	0.03	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.01	0.01	0.03	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.8	0.4	0.1	3.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.7	0.8	0.4	0.1	3.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.02	<0.01	<0.01	0.16	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	0.01	<0.01	<0.01	0.15	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	T2F	GW-D5	T3B	BH10
Client sampling date / time				19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711669-006	EP1711669-007	EP1711669-008	EP1711669-009	EP1711669-010	
				Result	Result	Result	Result	Result	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)				<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction				<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)				<20	<20	<20	<20	<20	
>C10 - C16 Fraction				<100	<100	<100	<100	<100	
>C16 - C34 Fraction				<100	<100	<100	<100	<100	
>C34 - C40 Fraction				<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)				<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)				<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene				<1	<1	<1	<1	<1	
Toluene				<2	<2	<2	<2	<2	
Ethylbenzene				<2	<2	<2	<2	<2	
meta- & para-Xylene				<2	<2	<2	<2	<2	
ortho-Xylene				<2	<2	<2	<2	<2	
^ Total Xylenes				<2	<2	<2	<2	<2	
^ Sum of BTEX				<1	<1	<1	<1	<1	
Naphthalene				<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4				106	112	106	105	106	
Toluene-D8				82.1	82.7	82.9	84.4	86.7	
4-Bromofluorobenzene				89.4	87.8	87.6	84.8	79.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D7	WQA01_191017	----	----
Client sampling date / time				19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1711669-011	EP1711669-012	EP1711669-013	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.08	0.03	0.02	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	0.002	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.001	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	0.003	0.003	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.004	0.002	0.002	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	0.49	0.06	0.06	----	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	1.1	0.5	0.6	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.02	0.02	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.79	19.0	18.7	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.79	19.0	18.7	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	5.0	5.6	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.0	24.0	24.3	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.21	0.21	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.21	0.21	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D7	WQA01_191017	----	----
Client sampling date / time				19-Oct-2017 00:00	19-Oct-2017 00:00	19-Oct-2017 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1711669-011	EP1711669-012	EP1711669-013	-----	-----	
				Result	Result	Result	----	----	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	105	108	106	----	----	
Toluene-D8	2037-26-5	2	%	82.6	85.7	88.1	----	----	
4-Bromofluorobenzene	460-00-4	2	%	82.7	80.4	75.8	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP17111878**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Tim Williamson

Site : ----

Quote number : EP/840/17

No. of samples received : 15

No. of samples analysed : 15

Page : 1 of 9

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 24-Oct-2017 17:35

Date Analysis Commenced : 24-Oct-2017

Issue Date : 31-Oct-2017 19:13



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



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Where moisture determination has been performed, results are reported on a dry weight basis.

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^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.
- It is recognised that EG094-T (Total Metals in Fresh Water by ORC-ICP-MS) is less than EG094-F (Dissolved Metals in Fresh Water by ORC-ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for some samples. However, the difference is within experimental variation of the methods.
- EK057G (Nitrite): LOR for samples 'A1E' and 'A3' raised due to possible sample matrix interference.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-001	EP1711878-002	EP1711878-003	EP1711878-004	EP1711878-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.07	0.06	0.06	0.21	
Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.004	0.004	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.260	0.262	0.268	0.267	0.020	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	3.44	4.57	6.25	3.91	1.13	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	0.17	0.16	0.07	0.25	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.002	0.002	
Manganese	7439-96-5	0.001	mg/L	0.255	0.258	0.272	0.257	0.021	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.010	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	4.27	5.33	9.91	4.22	1.29	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.4	0.3	0.3	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.2	0.3	0.2	0.2	<0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.19	0.46	0.59	0.35	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.02	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	<0.01	<0.02	0.02	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	<0.01	0.02	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.1	4.1	5.9	3.2	1.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.1	4.1	5.9	3.2	1.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-001	EP1711878-002	EP1711878-003	EP1711878-004	EP1711878-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.09	1.19	1.56	1.17	0.11	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.87	1.06	1.10	1.04	0.02	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	5	9	5	6	2	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	60	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	60	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	110	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	110	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	2	11	2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	2	11	2	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	103	104	103	103	
Toluene-D8	2037-26-5	2	%	103	103	103	104	103	
4-Bromofluorobenzene	460-00-4	2	%	103	101	98.7	98.6	98.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FS4A	RD1	RD1A	S1	A3
Client sampling date / time				23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-006	EP1711878-007	EP1711878-008	EP1711878-009	EP1711878-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.21	0.26	0.26	0.10	0.21	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	<0.001	<0.001	0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.001	0.001	0.001	0.001	
Copper	7440-50-8	0.001	mg/L	0.084	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.021	0.014	0.013	0.018	0.020	
Nickel	7440-02-0	0.001	mg/L	0.007	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.010	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	1.13	0.50	0.58	0.50	0.81	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.25	2.55	0.36	0.35	0.34	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0006	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.005	0.002	0.001	0.001	
Manganese	7439-96-5	0.001	mg/L	0.021	0.774	0.013	0.041	0.031	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.033	0.002	0.001	0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	2.44	<0.005	0.024	0.008	
Iron	7439-89-6	0.05	mg/L	1.32	14.2	0.80	1.19	1.30	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	0.4	0.5	<0.2	<0.2	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	0.9	0.5	0.3	<0.2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.07	0.06	0.04	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.02	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.03	0.02	0.01	<0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.03	0.02	0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.6	4.1	1.7	6.6	2.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.6	4.1	1.7	6.6	2.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	FS4A	RD1	RD1A	S1	A3
Client sampling date / time				23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	23-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-006	EP1711878-007	EP1711878-008	EP1711878-009	EP1711878-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	1.30	0.32	0.60	0.14	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.27	0.29	0.07	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	3	52	7	6	1	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	20	
C10 - C14 Fraction	----	50	µg/L	<50	90	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	380	<100	170	<100	
C29 - C36 Fraction	----	50	µg/L	<50	100	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	570	<50	170	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	260	<100	130	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	260	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	520	<100	130	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	260	<100	130	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	7	17	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	7	17	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	105	103	107	104	105	
Toluene-D8	2037-26-5	2	%	102	102	103	102	101	
4-Bromofluorobenzene	460-00-4	2	%	98.8	98.2	98.3	97.2	98.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4	T4B	T3C	D1	D2
Client sampling date / time				24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-011	EP1711878-012	EP1711878-013	EP1711878-014	EP1711878-015	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.33	0.28	0.03	0.11	0.36	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.002	
Manganese	7439-96-5	0.001	mg/L	0.001	0.006	0.007	0.002	0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.12	0.12	4.18	0.33	0.06	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	1.6	1.2	<0.2	0.3	0.4	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.92	0.20	0.02	0.06	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	<0.01	0.02	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	2.81	0.02	0.02	0.71	0.18	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	2.82	0.02	0.02	0.73	0.18	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	1.2	0.4	0.2	0.9	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.7	1.2	0.4	0.9	1.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.25	0.01	0.01	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.23	<0.01	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4	T4B	T3C	D1	D2	
Client sampling date / time					24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	24-Oct-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1711878-011	EP1711878-012	EP1711878-013	EP1711878-014	EP1711878-015		
				Result	Result	Result	Result	Result		
EP080/071: Total Petroleum Hydrocarbons - Continued										
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	<100
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	<100
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<2
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	<2
^ Total Xylenes				1330-20-7	2	µg/L	<2	<2	<2	<2
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4				17060-07-0	2	%	104	103	106	106
Toluene-D8				2037-26-5	2	%	101	102	102	97.3
4-Bromofluorobenzene				460-00-4	2	%	96.0	99.4	98.9	99.1



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1712054 Client : MRIA Contact : Tim Williamson Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 2 No. of samples analysed : 2	Page : 1 of 5 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 10 Hod Way Malaga WA Australia 6090 Telephone : 08 9209 7655 Date Samples Received : 27-Oct-2017 13:00 Date Analysis Commenced : 27-Oct-2017 Issue Date : 06-Nov-2017 16:40
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.
- EK067 (Total Phosphorus): LOR raised due to possible sample matrix interference.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID			BH12	GW-D8	----	----	----
Client sampling date / time				26-Oct-2017 00:00	26-Oct-2017 00:00	----	----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1712054-001	EP1712054-002	-----	-----	-----	-----	-----	
				Result	Result	----	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS											
Aluminium	7429-90-5	0.01	mg/L	0.02	0.12	----	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.002	<0.001	----	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.005	0.018	----	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.001	0.003	----	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.026	0.007	----	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	0.71	----	----	----	----	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS											
Selenium	7782-49-2	0.2	µg/L	0.5	0.3	----	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.28	----	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser											
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	14797-55-8	0.01	mg/L	3.83	1.15	----	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser											
Nitrite + Nitrate as N	----	0.01	mg/L	3.83	1.15	----	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser											
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	6.4	----	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser											
^ Total Nitrogen as N	----	0.1	mg/L	5.0	7.6	----	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser											
Total Phosphorus as P	----	0.01	mg/L	<0.02	0.05	----	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser											
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	----	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				BH12	GW-D8	----	----	----
Client sampling date / time				26-Oct-2017 00:00	26-Oct-2017 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EP1712054-001	EP1712054-002	-----	-----	-----
				Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	107	108	----	----	----
Toluene-D8	2037-26-5	2	%	101	101	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	94.6	94.2	----	----	----



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1712990**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA - R8 Rehab

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 14

No. of samples analysed : 14

Page : 1 of 10

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 17-Nov-2017 17:02

Date Analysis Commenced : 17-Nov-2017

Issue Date : 27-Nov-2017 07:43



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA



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Where moisture determination has been performed, results are reported on a dry weight basis.

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	D1	D2	T2F	GW-T3E-A	GW-D3
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1712990-001	EP1712990-002	EP1712990-003	EP1712990-004	EP1712990-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.10	0.52	0.05	0.50	0.04	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	0.003	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.002	<0.001	0.049	0.007	0.005	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.29	<0.05	2.09	0.48	0.41	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.7	0.5	<0.2	<0.2	0.5	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.03	0.44	0.36	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.06	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	1.92	0.78	<0.01	<0.01	0.10	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	1.98	0.78	<0.01	<0.01	0.10	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	1.2	1.0	2.0	<0.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.4	2.0	1.0	2.0	0.1	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.03	0.05	0.22	0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.02	0.07	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	1110	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	190	<50	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				D1	D2	T2F	GW-T3E-A	GW-D3
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	EP1712990-001	EP1712990-002	EP1712990-003	EP1712990-004	EP1712990-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	1300	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	1210	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	1210	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	126	130	131	127	128
Toluene-D8	2037-26-5	2	%	91.5	87.9	87.7	88.0	88.2
4-Bromofluorobenzene	460-00-4	2	%	93.2	85.9	85.7	89.1	86.0



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	GW-D4	GW-D5	T3B	T4B	----
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1712990-006	EP1712990-007	EP1712990-008	EP1712990-009	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.39	0.41	1.12	0.29	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.002	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.002	<0.001	0.003	0.005	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.10	0.73	0.45	0.10	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	1.8	<0.2	0.2	0.2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.09	0.09	0.87	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	3.57	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	3.59	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.4	0.2	1.2	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.2	0.4	0.2	1.2	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.04	0.02	0.26	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.26	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	70	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				GW-D4	GW-D5	T3B	T4B	----
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	----
Compound	CAS Number	LOR	Unit	EP1712990-006	EP1712990-007	EP1712990-008	EP1712990-009	-----
				Result	Result	Result	Result	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	70	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	127	133	128	131	----
Toluene-D8	2037-26-5	2	%	90.4	87.3	89.1	87.4	----
4-Bromofluorobenzene	460-00-4	2	%	87.1	89.5	86.6	88.5	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	WQA02_151117	BLNS-B1	A2	A2S	----
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1712990-010	EP1712990-011	EP1712990-012	EP1712990-013	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.01	0.01	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.002	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.005	0.005	0.005	0.006	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.12	0.13	0.12	0.12	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.07	0.06	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.002	0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.041	0.042	0.044	0.044	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.27	0.29	0.30	0.30	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.2	<0.2	0.3	0.2	----	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.5	0.3	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.03	<0.01	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	2.0	2.0	1.9	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.8	2.0	2.0	1.9	----	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	WQA02_151117	BLNS-B1	A2	A2S	----
Client sampling date / time				17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	17-Nov-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1712990-010	EP1712990-011	EP1712990-012	EP1712990-013	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.31	0.32	0.34	0.36	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.23	0.23	0.23	0.22	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	13	18	25	4	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	133	133	136	134	----	
Toluene-D8	2037-26-5	2	%	87.2	88.2	87.2	85.0	----	
4-Bromofluorobenzene	460-00-4	2	%	88.7	87.7	90.4	88.2	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			WQA05_DB TBW 1132	----	----	----	----
Client sampling date / time		17-Nov-2017 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1712990-014	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
[^] Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----	
[^] Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	130	----	----	----	----	
Toluene-D8	2037-26-5	2	%	90.2	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	86.0	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1712847**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 9

No. of samples analysed : 9

Page : 1 of 7

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 15-Nov-2017 15:00

Date Analysis Commenced : 15-Nov-2017

Issue Date : 22-Nov-2017 15:37



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.
- It is recognised that total phosphorus (EK067G) is less than reactive phosphorus (EK071G) for sample 'A1E'. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Client sample ID

				A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	EP1712847-001	EP1712847-002	EP1712847-003	EP1712847-004	EP1712847-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.08	0.07	0.16
Arsenic	7440-38-2	0.001	mg/L	0.004	0.005	0.004	0.005	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.002	0.002	0.002
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.261	0.243	0.246	0.257	0.029
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L	4.07	4.91	5.07	4.12	0.94
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.08	0.27	0.10	0.08	0.22
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.002	0.003	0.002	0.002	0.002
Manganese	7439-96-5	0.001	mg/L	0.273	0.270	0.261	0.275	0.033
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001
Zinc	7440-66-6	0.005	mg/L	0.006	0.010	0.007	0.006	0.008
Iron	7439-89-6	0.05	mg/L	4.46	6.28	5.73	4.52	1.93
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.2	0.2	0.3	0.3	0.3
EG094T: Total metals in Fresh water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.4	0.4	0.3	0.4	0.3
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.37	0.38	0.56	0.42	0.03
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.5	4.5	3.6	3.7	2.0
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	3.5	4.5	3.6	3.7	2.0



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1712847-001	EP1712847-002	EP1712847-003	EP1712847-004	EP1712847-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.29	1.41	1.18	1.36	0.13	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.23	1.22	1.26	1.24	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	22	18	47	23	34	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	350	<100	140	<100	130	
C29 - C36 Fraction	----	50	µg/L	190	70	80	60	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	540	70	220	60	130	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	460	140	190	130	140	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	460	140	190	130	140	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	2	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	107	110	111	112	116	
Toluene-D8	2037-26-5	2	%	103	97.6	96.0	101	97.5	
4-Bromofluorobenzene	460-00-4	2	%	81.8	82.4	82.8	83.0	82.5	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	FS4A	RD1	S1	A3	----
Client sampling date / time				15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1712847-006	EP1712847-007	EP1712847-008	EP1712847-009	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.16	0.14	0.09	0.20	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	0.001	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	<0.001	0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.033	0.053	0.030	0.032	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.011	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.94	0.42	0.57	1.16	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.26	0.86	0.23	0.27	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.002	0.005	0.001	0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.063	0.176	0.036	0.052	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.009	0.001	0.001	----	
Zinc	7440-66-6	0.005	mg/L	0.008	0.363	0.020	0.009	----	
Iron	7439-89-6	0.05	mg/L	1.92	5.71	1.02	2.77	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	0.5	0.2	<0.2	----	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.3	1.0	0.4	0.3	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.12	0.02	<0.01	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.04	0.02	0.02	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.04	0.02	0.02	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	11.7	8.2	2.1	1.7	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	11.7	8.2	2.1	1.7	----	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	FS4A	RD1	S1	A3	----
Client sampling date / time				15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	15-Nov-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1712847-006	EP1712847-007	EP1712847-008	EP1712847-009	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	1.67	3.09	0.22	0.06	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.16	0.04	<0.01	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	24	46	10	1	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	20	30	----	
C10 - C14 Fraction	----	50	µg/L	190	720	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	340	1310	260	<100	----	
C29 - C36 Fraction	----	50	µg/L	120	1310	170	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	650	3340	430	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	30	40	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	20	----	
>C10 - C16 Fraction	----	100	µg/L	220	320	140	<100	----	
>C16 - C34 Fraction	----	100	µg/L	320	2160	260	110	----	
>C34 - C40 Fraction	----	100	µg/L	<100	2200	210	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	540	4680	610	110	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	220	320	140	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	14	17	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	14	17	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	116	114	115	----	
Toluene-D8	2037-26-5	2	%	98.8	97.2	97.1	104	----	
4-Bromofluorobenzene	460-00-4	2	%	82.7	82.8	81.3	80.9	----	



Surrogate Control Limits

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1714429**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 16

No. of samples analysed : 16

Page : 1 of 10

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 20-Dec-2017 13:55

Date Analysis Commenced : 20-Dec-2017

Issue Date : 29-Dec-2017 19:41



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG093: All samples were run on EG094 method due to low TDS content.
- It is recognised that total phosphorus (EK067G) is less than reactive phosphorus (EK071G) for sample 'GW-T3E-A'. However, the difference is within experimental variation of the methods.
- It is recognised that Total Kjeldahl Nitrogen (EK061G) is less than Ammonia (EK055G) for sample 'T3C'. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	GW-D5	T2F	T3C	BH10
Client sampling date / time				20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1714429-001	EP1714429-002	EP1714429-003	EP1714429-004	EP1714429-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.31	0.46	0.05	0.03	0.43	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	<0.001	<0.001	0.005	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.007	0.002	0.056	0.012	0.014	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.34	2.10	2.51	0.97	3.62	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.37	0.11	0.43	0.12	0.18	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.05	0.03	0.02	0.04	0.02	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.05	0.03	0.02	0.04	0.02	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.4	0.9	0.1	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	0.4	0.9	0.1	0.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.07	<0.01	0.06	<0.01	0.10	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.08	<0.01	0.02	<0.01	0.02	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	GW-D5	T2F	T3C	BH10	
Client sampling date / time				20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00	20-Dec-2017 00:00		
Compound	CAS Number	LOR	Unit	EP1714429-001	EP1714429-002	EP1714429-003	EP1714429-004	EP1714429-005		
				Result	Result	Result	Result	Result		
EP080/071: Total Petroleum Hydrocarbons - Continued										
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	<100
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	<100
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<2
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	<2
^ Total Xylenes				----	2	µg/L	<2	<2	<2	<2
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4				17060-07-0	2	%	81.7	80.9	82.7	82.8
Toluene-D8				2037-26-5	2	%	101	102	100	102
4-Bromofluorobenzene				460-00-4	2	%	104	104	104	106



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	GW-D8	BH-12	D1	T4B
Client sampling date / time				20-Dec-2017 00:00	20-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1714429-006	EP1714429-007	EP1714429-008	EP1714429-009	EP1714429-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.37	0.25	0.02	0.10	0.33	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.003	0.004	0.002	0.001	0.005	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.005	0.002	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.007	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.44	0.26	<0.05	0.36	0.10	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.11	0.14	0.03	0.04	0.84	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	0.82	3.74	0.46	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.82	3.74	0.47	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	1.6	0.5	0.2	1.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.2	2.4	4.2	0.7	1.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.07	0.12	0.03	0.32	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.03	<0.01	<0.01	0.31	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	GW-D8	BH-12	D1	T4B
Client sampling date / time					20-Dec-2017 00:00	20-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		EP1714429-006	EP1714429-007	EP1714429-008	EP1714429-009	EP1714429-010
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		82.9	87.1	82.8	85.3	85.4
Toluene-D8	2037-26-5	2	%		104	99.7	103	102	99.8
4-Bromofluorobenzene	460-00-4	2	%		102	104	101	102	103



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				D2	GW-D4	T4B	GW-D3	T4B-A
Client sampling date / time				19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00
Compound	CAS Number	LOR	Unit	EP1714429-011	EP1714429-012	EP1714429-014	EP1714429-015	EP1714429-016
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.41	0.37	0.04	0.02	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	0.003	<0.001	<0.001	<0.001	----
Manganese	7439-96-5	0.001	mg/L	<0.001	0.002	0.006	0.006	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Iron	7439-89-6	0.05	mg/L	0.06	0.11	4.15	0.30	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.02	0.18	0.04	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.02	1.31	0.02	0.10	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	1.31	0.02	0.10	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.1	0.7	0.3	0.3	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.1	2.0	0.3	0.4	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.03	0.06	<0.01	0.05	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D2	GW-D4	T4B	GW-D3	T4B-A
Client sampling date / time					19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00	19-Dec-2017 00:00
Compound	CAS Number	LOR	Unit		EP1714429-011	EP1714429-012	EP1714429-014	EP1714429-015	EP1714429-016
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		86.1	87.1	88.1	85.9	88.1
Toluene-D8	2037-26-5	2	%		99.6	101	99.0	100.0	101
4-Bromofluorobenzene	460-00-4	2	%		104	102	101	100	101



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			T4B-B	----	----	----	----
Client sampling date / time		19-Dec-2017 00:00			----	----	----	----	----
Compound	CAS Number	LOR	Unit	EP1714429-017	-----	-----	-----	-----	-----
				Result	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	----
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	----
[^] Total Xylenes	----	2	µg/L	<2	----	----	----	----	----
[^] Sum of BTEX	----	1	µg/L	<1	----	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	90.5	----	----	----	----	----
Toluene-D8	2037-26-5	2	%	96.5	----	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	104	----	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : **EP1714152**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 9

No. of samples analysed : 9

Page : 1 of 7

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 14-Dec-2017 15:30

Date Analysis Commenced : 14-Dec-2017

Issue Date : 22-Dec-2017 14:37



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.
- It is recognised that EG020-T (Total Metals by ICP-MS) is less than EG020-F (Dissolved Metals by ICP-MS) for sample EP1714152 - 001 (A1). However, the difference is within experimental variation of the methods.
- EK058G/EK059G (Nitrate/NOx): LOR raised for various samples due to possible sample matrix interference.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1714152-001	EP1714152-002	EP1714152-003	EP1714152-004	EP1714152-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.03	0.05	0.11	
Arsenic	7440-38-2	0.001	mg/L	0.005	0.005	0.005	0.005	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.001	0.002	0.002	0.002	
Copper	7440-50-8	0.001	mg/L	0.005	0.001	<0.001	0.009	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.239	0.178	0.190	0.260	0.030	
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.006	0.031	<0.005	<0.005	0.008	
Iron	7439-89-6	0.05	mg/L	2.76	3.21	4.47	2.71	1.00	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.25	0.14	0.06	0.19	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.003	0.002	0.002	0.002	
Manganese	7439-96-5	0.001	mg/L	0.255	0.228	0.259	0.279	0.035	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.002	<0.001	0.002	
Zinc	7440-66-6	0.005	mg/L	0.011	0.084	0.016	0.006	0.023	
Iron	7439-89-6	0.05	mg/L	3.73	5.37	8.94	3.31	1.51	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	<0.2	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.5	0.5	0.5	0.4	0.5	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.08	0.05	0.14	0.26	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.02	<0.02	<0.02	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.02	<0.02	<0.02	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.3	5.0	5.9	4.0	4.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.3	5.0	5.9	4.0	4.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	FS2
Client sampling date / time				13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	
Compound	CAS Number	LOR	Unit	EP1714152-001	EP1714152-002	EP1714152-003	EP1714152-004	EP1714152-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.89	0.61	0.99	0.77	0.25	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.47	0.22	0.34	0.52	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	95	74	131	89	38	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	130	100	<100	140	
C29 - C36 Fraction	----	50	µg/L	<50	60	90	<50	70	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	190	190	<50	210	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	110	170	170	<100	190	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	110	170	170	<100	190	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	126	124	128	127	125	
Toluene-D8	2037-26-5	2	%	96.4	96.6	95.7	96.8	94.6	
4-Bromofluorobenzene	460-00-4	2	%	94.7	92.1	95.4	95.2	94.1	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2S	BLNS-B1	A2	WQA02_131217	----
Client sampling date / time				13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1714152-006	EP1714152-007	EP1714152-008	EP1714152-009	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.09	0.08	0.08	0.09	----	
Arsenic	7440-38-2	0.001	mg/L	0.003	0.004	0.003	0.003	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.011	0.011	0.011	0.011	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.08	0.07	0.07	0.07	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.11	0.10	0.16	0.10	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.043	0.042	0.056	0.043	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.19	0.18	0.44	0.19	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	<0.2	<0.2	----	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.4	0.4	0.4	0.4	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.2	5.0	5.5	4.7	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	5.2	5.0	5.5	4.7	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A2S	BLNS-B1	A2	WQA02_131217	----
Client sampling date / time				13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	13-Dec-2017 00:00	----	
Compound	CAS Number	LOR	Unit	EP1714152-006	EP1714152-007	EP1714152-008	EP1714152-009	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.68	0.70	0.76	0.64	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.18	0.18	0.18	0.18	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	127	139	121	131	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	120	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	120	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	129	134	123	128	----	
Toluene-D8	2037-26-5	2	%	101	96.3	94.9	96.4	----	
4-Bromofluorobenzene	460-00-4	2	%	96.2	95.4	99.4	91.2	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order	: EP1801308	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 16-Jan-2018 16:30
Order number	: W81020-103	Date Analysis Commenced	: 17-Jan-2018
C-O-C number	: ----	Issue Date	: 25-Jan-2018 13:42
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 6		
No. of samples analysed	: 6		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC Metals conducted by ALS Brisbane, NATA Site No. 818.
- Inorganics, Organics and Nutrients conducted by ALS Melbourne, NATA accreditation no. 825, site no 13778
- Chlorophyll a conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EK061G: EP1801306 #4 Poor matrix spike recovery for total Kjeldhal Nitrogen due to sample matrix effects. Confirmed by re-extraction and re-analysis.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID			GW-D8	BH12	----	----	----
Client sampling date / time				16-Jan-2018 00:00	15-Jan-2018 00:00	----	----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1801308-005	EP1801308-006	-----	-----	-----	-----	-----	
				Result	Result	----	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS											
Aluminium	7429-90-5	0.01	mg/L	0.28	<0.01	----	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	----	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	0.002	<0.001	----	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.003	<0.001	----	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	----	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.19	<0.05	----	----	----	----	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS											
Selenium	7782-49-2	0.2	µg/L	0.7	0.6	----	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser											
Ammonia as N	7664-41-7	0.01	mg/L	0.16	0.61	----	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser											
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	----	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser											
Nitrate as N	14797-55-8	0.01	mg/L	0.31	5.56	----	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser											
Nitrite + Nitrate as N	----	0.01	mg/L	0.32	5.56	----	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser											
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	0.6	----	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser											
^ Total Nitrogen as N	----	0.1	mg/L	1.3	6.2	----	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser											
Total Phosphorus as P	----	0.01	mg/L	0.11	0.21	----	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser											
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	<0.01	----	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons											
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----	



Analytical Results

Sub-Matrix: **GROUNDWATER**
 (Matrix: **WATER**)

Client sample ID

				GW-D8	BH12	----	----	----
Client sampling date / time				16-Jan-2018 00:00	15-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EP1801308-005	EP1801308-006	-----	-----	-----
				Result	Result	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	95.8	96.6	----	----	----
Toluene-D8	2037-26-5	2	%	89.2	85.0	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	103	98.8	----	----	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	----
Client sampling date / time				16-Jan-2018 00:00	16-Jan-2018 00:00	16-Jan-2018 00:00	16-Jan-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1801308-001	EP1801308-002	EP1801308-003	EP1801308-004	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.05	0.02	0.04	----	
Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.003	0.003	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.002	0.001	0.001	0.002	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.199	0.201	0.128	0.210	----	
Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	<0.001	0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	3.78	3.12	2.15	3.75	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	1.36	0.05	0.07	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.003	0.006	0.001	0.002	----	
Manganese	7439-96-5	0.001	mg/L	0.242	0.269	0.155	0.254	----	
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	<0.001	0.001	----	
Zinc	7440-66-6	0.005	mg/L	0.007	0.040	0.006	0.008	----	
Iron	7439-89-6	0.05	mg/L	8.31	15.5	4.36	8.09	----	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.6	0.3	0.4	0.5	----	
EG094T: Total metals in Fresh water by ORC-ICPMS									
Selenium	7782-49-2	0.2	µg/L	0.6	0.9	0.4	0.6	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.19	0.25	0.06	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.6	5.0	2.7	3.2	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.6	5.0	2.7	3.2	----	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	----
Client sampling date / time				16-Jan-2018 00:00	16-Jan-2018 00:00	16-Jan-2018 00:00	16-Jan-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1801308-001	EP1801308-002	EP1801308-003	EP1801308-004	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.40	0.70	0.47	0.92	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.07	0.10	0.08	0.08	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	63	117	83	82	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	170	130	110	160	----	
C29 - C36 Fraction	----	50	µg/L	60	90	60	80	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	230	220	170	240	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	230	210	170	220	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	230	210	170	220	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	97.3	95.7	94.5	96.3	----	
Toluene-D8	2037-26-5	2	%	85.4	86.9	80.2	86.3	----	
4-Bromofluorobenzene	460-00-4	2	%	100	103	98.0	98.4	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

CERTIFICATE OF ANALYSIS

Work Order : EM1801446 Client : MRIA Contact : Tim Williamson Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : Roe 8 Rehab Order number : W81020-103 C-O-C number : ---- Sampler : ---- Site : ---- Quote number : EP/840/17 No. of samples received : 9 No. of samples analysed : 9	Page : 1 of 7 Laboratory : Environmental Division Melbourne Contact : Brandon Ovens Address : 4 Westall Rd Springvale VIC Australia 3171 Telephone : 08 9209 7655 Date Samples Received : 16-Jan-2018 06:20 Date Analysis Commenced : 16-Jan-2018 Issue Date : 24-Jan-2018 15:00
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				D1	GW03	GW05	T4C	D2
Client sampling date / time				11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	EM1801446-001	EM1801446-002	EM1801446-003	EM1801446-004	EM1801446-009
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.08	0.03	0.37	0.03	0.42
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	0.002	<0.001	0.001
Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.002	<0.001	0.004
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.002
Manganese	7439-96-5	0.001	mg/L	0.002	0.006	0.005	0.006	<0.001
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	<0.001	0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.008	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L	0.42	0.24	3.44	3.41	<0.05
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	<0.2	0.3	0.2	<0.2	0.3
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.05	0.07	0.11	0.03
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	<0.01	0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.10	0.09	0.01	<0.01	0.04
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.11	0.10	0.01	0.01	0.04
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	0.2	0.7	0.2	1.7
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	1.1	0.3	0.7	0.2	1.7
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.07	0.07	0.11	0.06	0.37
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.01	0.01	0.01	0.02
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				D1	GW03	GW05	T4C	D2
Client sampling date / time				11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00
Compound	CAS Number	LOR	Unit	EM1801446-001	EM1801446-002	EM1801446-003	EM1801446-004	EM1801446-009
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	86.3	87.9	97.9	89.8	110
Toluene-D8	2037-26-5	2	%	93.0	93.1	106	94.9	102
4-Bromofluorobenzene	460-00-4	2	%	107	108	119	110	106



Analytical Results

Sub-Matrix: SURFACE WATER
 (Matrix: WATER)

Client sample ID

				BLNS-B1	WQA02	A2S	A2	----
Client sampling date / time				11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	----
Compound	CAS Number	LOR	Unit	EM1801446-005	EM1801446-006	EM1801446-007	EM1801446-008	-----
				Result	Result	Result	Result	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.04	0.03	0.03	0.03	----
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.002	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----
Copper	7440-50-8	0.001	mg/L	<0.001	0.001	<0.001	<0.001	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Manganese	7439-96-5	0.001	mg/L	0.002	0.003	0.002	0.002	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----
Iron	7439-89-6	0.05	mg/L	0.08	0.06	0.06	0.06	----
EG020T: Total Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.10	0.10	0.17	0.10	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Manganese	7439-96-5	0.001	mg/L	0.045	0.046	0.051	0.048	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----
Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	<0.005	<0.005	----
Iron	7439-89-6	0.05	mg/L	0.31	0.28	0.42	0.31	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.3	0.4	0.3	0.2	----
EG094T: Total metals in Fresh water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.3	0.4	0.4	0.4	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.04	0.03	0.13	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.01	0.01	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	0.01	0.01	0.01	<0.01	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.02	0.01	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.9	2.9	3.2	3.6	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.9	2.9	3.2	3.6	----



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	BLNS-B1	WQA02	A2S	A2	----
Client sampling date / time				11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	11-Jan-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EM1801446-005	EM1801446-006	EM1801446-007	EM1801446-008	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.30	0.32	0.38	0.36	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.03	0.03	0.03	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	25	26	25	17	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	110	120	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	110	120	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	100	<100	140	130	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	100	<100	140	130	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	102	95.1	99.4	96.5	----	
Toluene-D8	2037-26-5	2	%	108	99.2	102	104	----	
4-Bromofluorobenzene	460-00-4	2	%	120	114	118	118	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

CERTIFICATE OF ANALYSIS

Work Order : EM1801303 Client : MRIA Contact : Tim Williamson Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : Roe 8 Rehab Order number : W81020-103 C-O-C number : ---- Sampler : ---- Site : ---- Quote number : EP/840/17 No. of samples received : 7 No. of samples analysed : 7	Page : 1 of 7 Laboratory : Environmental Division Melbourne Contact : Brandon Ovens Address : 4 Westall Rd Springvale VIC Australia 3171 Telephone : 08 9209 7655 Date Samples Received : 12-Jan-2018 10:20 Date Analysis Commenced : 12-Jan-2018 Issue Date : 23-Jan-2018 14:08
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	BH10	T4B	T3C	T2F
Client sampling date / time				10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00	
Compound	CAS Number	LOR	Unit	EM1801303-001	EM1801303-002	EM1801303-003	EM1801303-004	EM1801303-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.16	0.15	0.26	0.01	0.07	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.003	0.008	0.004	0.012	0.083	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.007	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	0.010	
Iron	7439-89-6	0.05	mg/L	0.15	1.50	0.08	0.15	10.7	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.20	0.91	0.10	0.56	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.8	1.2	0.1	1.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.2	0.8	1.2	0.1	1.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	1.45	0.32	0.02	0.04	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.30	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	110	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	BH10	T4B	T3C	T2F
Client sampling date / time					10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00	10-Jan-2018 00:00
Compound	CAS Number	LOR	Unit		EM1801303-001	EM1801303-002	EM1801303-003	EM1801303-004	EM1801303-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	110	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	160	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	160	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		97.3	104	95.9	98.9	101
Toluene-D8	2037-26-5	2	%		87.5	91.7	93.2	90.5	92.7
4-Bromofluorobenzene	460-00-4	2	%		110	112	115	113	115



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID				
				GW-D4	GW-T3E-A	----	----	----
Client sampling date / time				10-Jan-2018 00:00	10-Jan-2018 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EM1801303-006	EM1801303-007	-----	-----	-----
				Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.33	0.61	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.002	0.008	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----
Iron	7439-89-6	0.05	mg/L	0.11	0.61	----	----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.43	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	4.11	<0.01	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	4.11	<0.01	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.7	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	4.9	0.7	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.04	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4	GW-T3E-A	----	----	----
Client sampling date / time				10-Jan-2018 00:00	10-Jan-2018 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EM1801303-006	EM1801303-007	-----	-----	-----	
				Result	Result	----	----	----	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	100	102	----	----	----	
Toluene-D8	2037-26-5	2	%	90.4	97.8	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	115	118	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	73	129
Toluene-D8	2037-26-5	70	125
4-Bromofluorobenzene	460-00-4	71	129

CERTIFICATE OF ANALYSIS

Work Order : **EP1713111**

Client : **MRIA**

Contact : Tim Williamson

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : MRIA - R8 Rehab

Order number : W81020-103

C-O-C number : ----

Sampler : Rachel Champion

Site : ----

Quote number : EP/840/17

No. of samples received : 8

No. of samples analysed : 8

Page : 1 of 8

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 10 Hod Way Malaga WA Australia 6090

Telephone : 08 9209 7655

Date Samples Received : 21-Nov-2017 16:45

Date Analysis Commenced : 21-Nov-2017

Issue Date : 28-Nov-2017 16:15



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Brisbane, NATA Site No. 818.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID				
				BH10	T3C	GW-D7	GW-D8	T4C
Client sampling date / time				20-Nov-2017 00:00	20-Nov-2017 00:00	20-Nov-2017 00:00	20-Nov-2017 00:00	21-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	EP1713111-001	EP1713111-002	EP1713111-003	EP1713111-004	EP1713111-005
				Result	Result	Result	Result	Result
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.90	0.07	0.04	0.35	0.03
Arsenic	7440-38-2	0.001	mg/L	0.003	<0.001	0.002	<0.001	<0.001
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.001	0.001	<0.001
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.002	0.002	<0.001
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001
Manganese	7439-96-5	0.001	mg/L	0.006	0.011	0.006	0.010	0.007
Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	0.001	0.002	<0.001
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005
Iron	7439-89-6	0.05	mg/L	3.54	0.99	0.07	0.79	4.32
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.7	<0.2	0.5	0.9	0.2
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.38	0.06	0.03	0.28	0.19
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	21.3	0.51	<0.01
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	21.3	0.51	<0.01
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.8	0.2	4.8	1.5	0.3
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	2.8	0.2	26.1	2.0	0.3
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.12	<0.01	0.84	0.08	<0.01
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	<0.01	0.20	0.02	<0.01
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				BH10	T3C	GW-D7	GW-D8	T4C
Client sampling date / time				20-Nov-2017 00:00	20-Nov-2017 00:00	20-Nov-2017 00:00	20-Nov-2017 00:00	21-Nov-2017 00:00
Compound	CAS Number	LOR	Unit	EP1713111-001	EP1713111-002	EP1713111-003	EP1713111-004	EP1713111-005
				Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	77.9	82.9	80.4	80.0	83.6
Toluene-D8	2037-26-5	2	%	110	107	110	109	108
4-Bromofluorobenzene	460-00-4	2	%	88.7	89.1	88.2	88.7	86.2



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID				
				BH12	WQA01_201117	----	----	----
Client sampling date / time				21-Nov-2017 00:00	20-Nov-2017 00:00	----	----	----
Compound	CAS Number	LOR	Unit	EP1713111-006	EP1713111-007	-----	-----	-----
				Result	Result	----	----	----
EG020F: Dissolved Metals by ICP-MS								
Aluminium	7429-90-5	0.01	mg/L	0.02	0.04	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.002	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	0.002	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.002	0.006	----	----	----
Nickel	7440-02-0	0.001	mg/L	0.002	0.001	----	----	----
Zinc	7440-66-6	0.005	mg/L	0.030	<0.005	----	----	----
Iron	7439-89-6	0.05	mg/L	<0.05	0.06	----	----	----
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Selenium	7782-49-2	0.2	µg/L	0.6	0.5	----	----	----
EK055G: Ammonia as N by Discrete Analyser								
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	----	----	----
EK057G: Nitrite as N by Discrete Analyser								
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----
EK058G: Nitrate as N by Discrete Analyser								
Nitrate as N	14797-55-8	0.01	mg/L	4.67	15.8	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Nitrite + Nitrate as N	----	0.01	mg/L	4.67	15.8	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	4.8	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser								
^ Total Nitrogen as N	----	0.1	mg/L	5.3	20.6	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser								
Total Phosphorus as P	----	0.01	mg/L	0.07	0.86	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser								
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.28	----	----	----
EP080/071: Total Petroleum Hydrocarbons								
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH12	WQA01_201117	----	----	----
Client sampling date / time				21-Nov-2017 00:00	20-Nov-2017 00:00	----	----	----	
Compound	CAS Number	LOR	Unit	EP1713111-006	EP1713111-007	-----	-----	-----	
				Result	Result	----	----	----	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	<2	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	82.6	85.0	----	----	----	
Toluene-D8	2037-26-5	2	%	107	109	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	87.0	84.3	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			WQA06_DB TBW 1133	----	----	----	----
Client sampling date / time		20-Nov-2017 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1713111-008	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	1330-20-7	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	83.1	----	----	----	----	
Toluene-D8	2037-26-5	2	%	108	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	86.1	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1802093 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 8 No. of samples analysed : 8	Page : 1 of 7 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9209 7655 Date Samples Received : 07-Feb-2018 16:30 Date Analysis Commenced : 07-Feb-2018 Issue Date : 15-Feb-2018 17:46
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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
David Viner	SENIOR LAB TECH	Perth Organics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG093: Samples were run under EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	GW-T3E-A
Client sampling date / time				07-Feb-2018 00:00	07-Feb-2018 00:00	07-Feb-2018 00:00	07-Feb-2018 00:00	06-Feb-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1802093-001	EP1802093-002	EP1802093-003	EP1802093-004	EP1802093-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.11	0.03	0.05	0.59	
Arsenic	7440-38-2	0.001	mg/L	0.005	0.005	0.004	0.006	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.001	0.002	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	0.001	0.004	<0.001	0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.351	0.180	0.142	0.338	0.007	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	<0.001	0.001	0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	4.05	3.36	2.52	3.89	0.63	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.10	1.36	0.13	0.12	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.003	0.004	0.002	0.003	----	
Manganese	7439-96-5	0.001	mg/L	0.391	0.230	0.202	0.389	----	
Nickel	7440-02-0	0.001	mg/L	0.001	0.002	0.001	0.001	----	
Zinc	7440-66-6	0.005	mg/L	0.006	0.062	0.006	0.011	----	
Iron	7439-89-6	0.05	mg/L	7.08	11.5	6.01	8.45	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.07	0.05	0.05	0.30	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	6.2	11.3	7.6	8.3	1.0	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	6.2	11.3	7.6	8.3	1.0	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	A1	A1N	A1E	NLWS-N2	GW-T3E-A
Client sampling date / time				07-Feb-2018 00:00	07-Feb-2018 00:00	07-Feb-2018 00:00	07-Feb-2018 00:00	06-Feb-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1802093-001	EP1802093-002	EP1802093-003	EP1802093-004	EP1802093-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.55	0.95	0.82	1.00	0.06	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.10	0.03	0.07	0.14	0.03	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	153	80	95	308	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	160	280	240	400	<100	
C29 - C36 Fraction	----	50	µg/L	90	180	110	190	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	250	460	350	590	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	220	410	310	550	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	220	410	310	550	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	110	107	110	109	111	
Toluene-D8	2037-26-5	2	%	99.0	102	98.1	99.2	99.0	
4-Bromofluorobenzene	460-00-4	2	%	95.0	95.4	93.2	94.1	92.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5	T2F	WQA01_060218	----	----
Client sampling date / time				06-Feb-2018 00:00	06-Feb-2018 00:00	06-Feb-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1802093-006	EP1802093-007	EP1802093-008	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.30	0.05	0.63	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.001	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.007	0.053	0.007	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	6.38	1.97	0.68	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.12	0.44	0.31	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	0.02	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	0.02	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	1.1	1.1	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	1.1	1.1	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.01	0.05	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.03	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5	T2F	WQA01_060218	----	----		
Client sampling date / time				06-Feb-2018 00:00	06-Feb-2018 00:00	06-Feb-2018 00:00	----	----			
Compound	CAS Number	LOR	Unit	EP1802093-006	EP1802093-007	EP1802093-008	-----	-----			
				Result	Result	Result	----	----			
EP080/071: Total Petroleum Hydrocarbons - Continued											
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions											
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN											
Benzene				71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene				108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes				----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	----	----
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates											
1,2-Dichloroethane-D4				17060-07-0	2	%	108	110	109	----	----
Toluene-D8				2037-26-5	2	%	98.7	97.8	99.0	----	----
4-Bromofluorobenzene				460-00-4	2	%	92.8	89.7	93.3	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1802224 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 10 No. of samples analysed : 10	Page : 1 of 9 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9209 7655 Date Samples Received : 09-Feb-2018 16:00 Date Analysis Commenced : 09-Feb-2018 Issue Date : 19-Feb-2018 17:46
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH12	GW-D3	GW-D4	----	----
Client sampling date / time				09-Feb-2018 00:00	09-Feb-2018 00:00	09-Feb-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1802224-005	EP1802224-006	EP1802224-007	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.02	0.66	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	<0.001	0.006	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	0.51	0.15	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.03	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	4.84	0.37	2.16	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	4.84	0.37	2.16	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.2	0.5	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	5.7	0.6	2.7	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.03	<0.01	0.01	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	BH12	GW-D3	GW-D4	----	----
Client sampling date / time				09-Feb-2018 00:00	09-Feb-2018 00:00	09-Feb-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1802224-005	EP1802224-006	EP1802224-007	-----	-----	
				Result	Result	Result	----	----	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	137	114	110	----	----	
Toluene-D8	2037-26-5	2	%	93.2	90.9	90.9	----	----	
4-Bromofluorobenzene	460-00-4	2	%	89.4	89.7	88.4	----	----	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	A2	A2S	BLNS-B1	WQA02_080218	----
Client sampling date / time				08-Feb-2018 00:00	08-Feb-2018 00:00	08-Feb-2018 00:00	08-Feb-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1802224-001	EP1802224-002	EP1802224-003	EP1802224-004	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.05	0.05	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.002	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.006	0.007	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.06	0.06	<0.05	<0.05	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.06	0.06	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.035	0.033	0.032	0.032	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.13	0.12	0.09	0.10	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.01	<0.01	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	2.8	2.9	2.7	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.0	2.8	2.9	2.7	----	



Analytical Results

Sub-Matrix: SURFACE WATER (Matrix: WATER)				Client sample ID	A2	A2S	BLNS-B1	WQA02_080218	----
Client sampling date / time				08-Feb-2018 00:00	08-Feb-2018 00:00	08-Feb-2018 00:00	08-Feb-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1802224-001	EP1802224-002	EP1802224-003	EP1802224-004	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.15	0.10	0.10	0.08	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	73	25	26	25	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	106	110	140	136	----	
Toluene-D8	2037-26-5	2	%	95.2	91.8	95.1	94.0	----	
4-Bromofluorobenzene	460-00-4	2	%	90.4	89.5	88.4	88.9	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA04_DB TBW 999	WQA03_080218	WQA03_090218	----	----
Client sampling date / time				09-Feb-2018 00:00	08-Feb-2018 00:00	09-Feb-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1802224-008	EP1802224-009	EP1802224-010	-----	-----	
				Result	Result	Result	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	<0.01	<0.01	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	----	<0.001	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	<0.001	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	----	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	<0.05	<0.05	----	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	<2	<2	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	----	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	----	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	----	<50	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	----	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	----	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	----	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	----	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	----	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	----	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA04_DB TBW 999	WQA03_080218	WQA03_090218	----	----
Client sampling date / time				09-Feb-2018 00:00	08-Feb-2018 00:00	09-Feb-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1802224-008	EP1802224-009	EP1802224-010	-----	-----	
				Result	Result	Result	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	137	136	141	----	----	
Toluene-D8	2037-26-5	2	%	93.6	94.8	92.8	----	----	
4-Bromofluorobenzene	460-00-4	2	%	88.7	89.9	89.3	----	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: SURFACE WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1802359 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 10 No. of samples analysed : 10	Page : 1 of 7 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9209 7655 Date Samples Received : 13-Feb-2018 16:20 Date Analysis Commenced : 13-Feb-2018 Issue Date : 20-Feb-2018 17:20
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG093: All samples were run on EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D8	T3B	T3C	T4B	T4C
Client sampling date / time				12-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1802359-001	EP1802359-002	EP1802359-003	EP1802359-004	EP1802359-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.16	0.04	0.05	0.24	0.03	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.015	0.004	0.006	
Nickel	7440-02-0	0.001	mg/L	0.008	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.18	0.70	1.29	0.09	3.90	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.14	0.04	0.09	1.04	0.19	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.57	<0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.57	<0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.2	0.2	1.4	0.3	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.4	0.2	0.2	1.4	0.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.04	<0.01	<0.01	0.34	<0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	<0.01	<0.01	0.34	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D8	T3B	T3C	T4B	T4C
Client sampling date / time					12-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00
Compound	CAS Number	LOR	Unit		EP1802359-001	EP1802359-002	EP1802359-003	EP1802359-004	EP1802359-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		107	104	101	101	104
Toluene-D8	2037-26-5	2	%		96.8	97.0	99.4	95.3	98.6
4-Bromofluorobenzene	460-00-4	2	%		90.1	88.7	92.1	90.8	91.7



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA05_DB TBW 998	WQA03_130218	BH10
Client sampling date / time					13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00
Compound	CAS Number	LOR	Unit	EP1802359-006	EP1802359-007	EP1802359-008	EP1802359-009	EP1802359-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.11	0.35	----	----	0.24	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	0.003	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	----	----	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.005	----	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.001	<0.001	----	----	0.011	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.47	0.06	----	----	3.42	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	<0.01	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	----	----	----	<0.001	----	
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	----	
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	----	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.05	----	----	0.16	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.27	0.23	----	----	0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.28	0.23	----	----	0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	1.0	----	----	1.0	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.5	1.2	----	----	1.0	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA05_DB TBW 998	WQA03_130218	BH10
Client sampling date / time					13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00	13-Feb-2018 00:00
Compound	CAS Number	LOR	Unit		EP1802359-006	EP1802359-007	EP1802359-008	EP1802359-009	EP1802359-010
					Result	Result	Result	Result	Result
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.02	0.02	----	----	0.04
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	<0.01	----	----	0.02
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	<20
C10 - C14 Fraction	----	50	µg/L		<50	<50	----	<50	<50
C15 - C28 Fraction	----	100	µg/L		<100	<100	----	<100	<100
C29 - C36 Fraction	----	50	µg/L		<50	<50	----	<50	<50
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	----	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	----	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	----	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	----	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	----	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	----	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		99.2	104	110	105	105
Toluene-D8	2037-26-5	2	%		100	98.7	95.3	99.9	95.5
4-Bromofluorobenzene	460-00-4	2	%		88.6	90.3	88.0	88.0	89.2



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1804348 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 14 No. of samples analysed : 14	Page : 1 of 9 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 04-Apr-2018 16:14 Date Analysis Commenced : 04-Apr-2018 Issue Date : 13-Apr-2018 00:02
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC Metals analysis conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG093: All samples were run on EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	T2F	GW-D5	GW-D8	BH12
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1804348-001	EP1804348-002	EP1804348-003	EP1804348-004	EP1804348-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.30	0.09	0.85	0.31	<0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.003	0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.006	0.087	<0.001	0.003	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.38	9.92	0.98	0.23	0.05	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.44	0.05	0.10	0.03	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	0.01	4.32	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	0.01	4.32	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	1.3	0.6	1.2	0.9	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	1.3	0.6	1.2	5.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.02	0.20	0.05	<0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	<0.01	<0.01	0.02	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	T2F	GW-D5	GW-D8	BH12	
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00		
Compound	CAS Number	LOR	Unit	EP1804348-001	EP1804348-002	EP1804348-003	EP1804348-004	EP1804348-005		
				Result	Result	Result	Result	Result		
EP080/071: Total Petroleum Hydrocarbons - Continued										
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	<100
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	<100
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<2
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	<2
^ Total Xylenes				----	2	µg/L	<2	<2	<2	<2
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4				17060-07-0	2	%	120	120	125	117
Toluene-D8				2037-26-5	2	%	80.9	95.5	109	101
4-Bromofluorobenzene				460-00-4	2	%	83.0	87.9	93.0	88.1



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA03_040418	WQA05_DB TBW 404	WQA01_040418
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1804348-006	EP1804348-007	EP1804348-008	EP1804348-009	EP1804348-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.08	0.23	----	----	0.32	
Arsenic	7440-38-2	0.001	mg/L	<0.001	0.001	----	----	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	----	----	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.002	----	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.002	<0.001	----	----	0.006	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.67	0.06	----	----	0.37	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	<0.01	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	----	----	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	----	----	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	----	<0.05	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.06	----	----	0.37	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	0.5	----	----	0.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	<0.1	0.5	----	----	0.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA03_040418	WQA05_DB TBW 404	WQA01_040418
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1804348-006	EP1804348-007	EP1804348-008	EP1804348-009	EP1804348-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	----	----	0.06	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	0.05	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	123	120	108	120	128	
Toluene-D8	2037-26-5	2	%	117	89.4	101	83.7	92.9	
4-Bromofluorobenzene	460-00-4	2	%	93.0	94.1	93.7	86.2	93.7	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	A2S	WAQ02_040418	----
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1804348-011	EP1804348-012	EP1804348-013	EP1804348-014	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.05	0.06	----	
Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.003	0.003	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.014	0.017	0.014	0.015	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.07	0.07	0.14	0.08	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.35	0.07	0.14	0.11	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.047	0.041	0.042	0.041	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	0.006	0.011	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.83	0.14	0.34	0.28	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.07	0.06	0.09	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.1	3.8	4.3	4.0	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	5.1	3.8	4.3	4.0	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	A2S	WAQ02_040418	----
Client sampling date / time				04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	04-Apr-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1804348-011	EP1804348-012	EP1804348-013	EP1804348-014	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.18	0.08	0.13	0.09	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	24	19	32	50	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
>C16 - C34 Fraction	----	100	µg/L	<100	120	<100	100	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	120	<100	100	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	100	121	124	124	----	
Toluene-D8	2037-26-5	2	%	102	108	101	84.7	----	
4-Bromofluorobenzene	460-00-4	2	%	84.9	103	81.1	84.6	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1803361 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W81020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 10 No. of samples analysed : 10	Page : 1 of 7 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 09-Mar-2018 15:20 Date Analysis Commenced : 09-Mar-2018 Issue Date : 16-Mar-2018 17:28
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	T3C	BH10	NLWS-N2	A2S
Client sampling date / time				09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803361-001	EP1803361-002	EP1803361-003	EP1803361-004	EP1803361-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.28	0.01	0.05	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.003	0.003	0.002	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	0.002	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.004	0.022	0.011	0.490	0.012	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.76	1.95	2.99	1.04	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	0.03	0.07	
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	----	----	----	0.002	<0.001	
Manganese	7439-96-5	0.001	mg/L	----	----	----	0.478	0.041	
Nickel	7440-02-0	0.001	mg/L	----	----	----	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	----	----	----	7.31	0.14	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	----	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.07	0.12	0.02	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.2	1.0	6.1	3.5	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.4	0.2	1.0	6.1	3.5	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B	T3C	BH10	NLWS-N2	A2S
Client sampling date / time				09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803361-001	EP1803361-002	EP1803361-003	EP1803361-004	EP1803361-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.05	0.17	0.11	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.01	<0.01	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	----	----	----	68	20	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	180	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	180	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	200	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	200	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	123	126	137	135	138	
Toluene-D8	2037-26-5	2	%	98.2	97.9	94.6	92.2	91.0	
4-Bromofluorobenzene	460-00-4	2	%	73.3	73.4	72.5	76.8	74.4	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	WQA05_TBW119	WQA03_090318	WQA02_090318
Client sampling date / time				09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803361-006	EP1803361-007	EP1803361-008	EP1803361-009	EP1803361-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.04	----	----	0.05	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.003	----	----	0.003	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.015	0.014	----	----	0.015	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.05	<0.05	----	----	<0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.08	0.07	----	<0.01	0.07	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.041	0.048	----	<0.001	0.038	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	0.014	<0.005	----	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.14	0.12	----	<0.05	0.13	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	----	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	----	----	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.5	3.6	----	----	3.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.5	3.6	----	----	3.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1	A2	WQA05_TBW119	WQA03_090318	WQA02_090318
Client sampling date / time				09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	09-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803361-006	EP1803361-007	EP1803361-008	EP1803361-009	EP1803361-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.13	0.10	----	----	0.13	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	25	19	----	----	24	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	138	136	124	127	139	
Toluene-D8	2037-26-5	2	%	90.8	91.5	95.4	94.5	91.8	
4-Bromofluorobenzene	460-00-4	2	%	72.3	72.3	71.8	71.8	72.5	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1803480 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA (Roe 8 Rehab) Order number : W181020-103 C-O-C number : ---- Sampler : Rachel Champion Site : ---- Quote number : EP/840/17 No. of samples received : 4 No. of samples analysed : 4	Page : 1 of 6 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 13-Mar-2018 16:30 Date Analysis Commenced : 13-Mar-2018 Issue Date : 20-Mar-2018 08:51
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<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG093: All samples were run on EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: GROUNDWATER (Matrix: WATER)				Client sample ID	GW-D4	GW-D8	BH12	----	----
Client sampling date / time				12-Mar-2018 00:00	13-Mar-2018 00:00	13-Mar-2018 00:00	----	----	
Compound	CAS Number	LOR	Unit	EP1803480-001	EP1803480-002	EP1803480-003	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.38	0.16	<0.01	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.001	0.003	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.007	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	0.030	0.006	0.010	----	----	
Iron	7439-89-6	0.05	mg/L	0.10	0.32	<0.05	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.10	0.02	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.01	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	4.19	0.05	4.72	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	4.20	0.05	4.72	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	1.0	0.5	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	4.5	1.0	5.2	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.05	<0.02	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.02	<0.01	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	



Analytical Results

Sub-Matrix: GROUNDWATER
 (Matrix: WATER)

Client sample ID

				GW-D4	GW-D8	BH12	----	----
Client sampling date / time				12-Mar-2018 00:00	13-Mar-2018 00:00	13-Mar-2018 00:00	----	----
Compound	CAS Number	LOR	Unit	EP1803480-001	EP1803480-002	EP1803480-003	-----	-----
				Result	Result	Result	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	78.8	67.0	70.0	----	----
Toluene-D8	2037-26-5	2	%	109	121	109	----	----
4-Bromofluorobenzene	460-00-4	2	%	87.1	79.5	87.4	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			WQA04_TBW118	----	----	----	----
Client sampling date / time		13-Mar-2018 00:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1803480-004	-----	-----	-----	-----	
				Result	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	----	----	----	----	
Toluene	108-88-3	2	µg/L	<2	----	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----	
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----	
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	68.6	----	----	----	----	
Toluene-D8	2037-26-5	2	%	110	----	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	87.6	----	----	----	----	



Surrogate Control Limits

Sub-Matrix: GROUNDWATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EP080: Samples EP1803299-001 and 010 are positive for the C6-C9 fraction due to compounds other than BTEX.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	GW-D3	GW-D5	T4B	T4C
Client sampling date / time				08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803299-001	EP1803299-002	EP1803299-003	EP1803299-004	EP1803299-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.40	0.02	0.51	0.23	0.02	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.002	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.007	0.006	0.003	0.004	0.006	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.44	0.58	3.97	0.08	3.94	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.03	0.09	0.83	0.20	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.22	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.22	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	<0.1	0.5	1.0	0.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.8	0.2	0.5	1.0	0.4	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.05	1.11	0.01	0.27	<0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.05	<0.01	0.01	0.27	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	30	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A	GW-D3	GW-D5	T4B	T4C	
Client sampling date / time				08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00		
Compound	CAS Number	LOR	Unit	EP1803299-001	EP1803299-002	EP1803299-003	EP1803299-004	EP1803299-005		
				Result	Result	Result	Result	Result		
EP080/071: Total Petroleum Hydrocarbons - Continued										
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	<100
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	<100
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<2
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	<2
^ Total Xylenes				----	2	µg/L	<2	<2	<2	<2
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4				17060-07-0	2	%	100	88.4	102	103
Toluene-D8				2037-26-5	2	%	95.6	103	97.1	96.7
4-Bromofluorobenzene				460-00-4	2	%	79.2	72.4	76.6	84.0



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA04_TBW 117	WQA03_080318	WQA01_080318
Client sampling date / time				08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803299-006	EP1803299-007	EP1803299-008	EP1803299-009	EP1803299-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	0.30	----	----	0.41	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.001	----	----	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	0.004	----	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.002	<0.001	----	----	0.007	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.58	0.06	----	----	0.45	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	<0.01	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	----	----	----	<0.001	----	
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	----	
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	----	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	----	----	0.36	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.06	0.26	----	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.26	----	----	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	0.6	----	----	0.8	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	<0.1	0.9	----	----	0.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1	D2	WQA04_TBW 117	WQA03_080318	WQA01_080318
Client sampling date / time				08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	08-Mar-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1803299-006	EP1803299-007	EP1803299-008	EP1803299-009	EP1803299-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	----	----	0.06	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	----	----	0.05	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	30	
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	97.4	98.8	94.9	91.9	101	
Toluene-D8	2037-26-5	2	%	98.2	97.9	97.6	101	99.8	
4-Bromofluorobenzene	460-00-4	2	%	76.5	79.2	76.2	74.6	78.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T2F	----	----	----	----
Client sampling date / time				08-Mar-2018 00:00	----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1803299-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.045	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	1.63	----	----	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.38	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.7	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		T2F	----	----	----	----
Client sampling date / time		08-Mar-2018 00:00		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EP1803299-011	-----	-----	-----	-----
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	108	----	----	----	----
Toluene-D8	2037-26-5	2	%	93.2	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	79.4	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order	: EP1804292	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 03-Apr-2018 17:05
Order number	: W81020-103	Date Analysis Commenced	: 03-Apr-2018
C-O-C number	: ----	Issue Date	: 11-Apr-2018 17:48
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

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When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ORC METALS conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D4	BH10	T3B	T3C
Client sampling date / time				03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1804292-001	EP1804292-002	EP1804292-003	EP1804292-004	EP1804292-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	3.55	0.02	0.04	0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.004	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.004	<0.001	0.006	0.003	0.023	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.44	0.67	3.07	0.84	1.85	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.02	0.09	0.05	0.10	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.30	4.44	0.03	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.30	4.44	0.03	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.8	0.4	0.1	0.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.4	5.2	0.4	0.1	0.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.08	0.04	<0.01	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3	GW-D4	BH10	T3B	T3C
Client sampling date / time					03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00
Compound	CAS Number	LOR	Unit		EP1804292-001	EP1804292-002	EP1804292-003	EP1804292-004	EP1804292-005
					Result	Result	Result	Result	Result
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		108	110	115	118	114
Toluene-D8	2037-26-5	2	%		101	101	99.9	99.0	99.2
4-Bromofluorobenzene	460-00-4	2	%		82.2	79.7	82.0	80.9	79.9



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T4C	T4B	WQA03_030418	WQA04_DB TBW 246	----
Client sampling date / time				03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1804292-006	EP1804292-007	EP1804292-008	EP1804292-009	-----	
				Result	Result	Result	Result	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.34	0.18	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	<0.001	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.013	0.003	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----	
Iron	7439-89-6	0.05	mg/L	2.77	0.08	----	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	<0.01	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	----	----	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	----	----	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	----	<0.05	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.23	0.78	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.9	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.3	0.9	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T4C	T4B	WQA03_030418	WQA04_DB TBW 246	----
Client sampling date / time				03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	03-Apr-2018 00:00	----	
Compound	CAS Number	LOR	Unit	EP1804292-006	EP1804292-007	EP1804292-008	EP1804292-009	-----	
				Result	Result	Result	Result	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.04	0.37	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.28	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	116	118	113	117	----	
Toluene-D8	2037-26-5	2	%	97.5	97.9	103	99.5	----	
4-Bromofluorobenzene	460-00-4	2	%	79.7	80.9	80.6	79.9	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1805453 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA - R8 Rehab Order number : W81020-103 C-O-C number : ---- Sampler : Danielle Sullivan Site : ---- Quote number : EP/840/17 No. of samples received : 11 No. of samples analysed : 11	Page : 1 of 9 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 02-May-2018 03:45 Date Analysis Commenced : 02-May-2018 Issue Date : 10-May-2018 17:53
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Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

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LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG020: It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.
- EG093: Samples were run under EG094 method due to low TDS content.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_020518	A2_020518	A2S_020518	BH12_020518	GW-D3_020518
Client sampling date / time				02-May-2018 09:33	02-May-2018 09:59	02-May-2018 09:31	02-May-2018 07:54	02-May-2018 13:13	
Compound	CAS Number	LOR	Unit	EP1805453-001	EP1805453-002	EP1805453-003	EP1805453-004	EP1805453-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.04	0.05	0.08	0.03	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.003	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.009	0.006	0.010	0.023	0.005	
Nickel	7440-02-0	0.001	mg/L	0.003	0.001	<0.001	0.002	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	0.013	<0.005	
Iron	7439-89-6	0.05	mg/L	0.08	0.07	0.08	<0.05	0.65	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.08	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	0.026	0.023	0.027	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	0.019	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	0.17	0.16	0.19	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.04	0.04	0.03	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	2.89	0.52	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	2.89	0.52	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.9	4.0	4.0	0.4	<0.1	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	3.9	4.0	4.0	3.3	0.5	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_020518	A2_020518	A2S_020518	BH12_020518	GW-D3_020518
Client sampling date / time				02-May-2018 09:33	02-May-2018 09:59	02-May-2018 09:31	02-May-2018 07:54	02-May-2018 13:13	
Compound	CAS Number	LOR	Unit	EP1805453-001	EP1805453-002	EP1805453-003	EP1805453-004	EP1805453-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.04	0.05	0.07	0.04	<0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	18	16	20	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	103	125	130	127	119	
Toluene-D8	2037-26-5	2	%	99.0	92.0	93.5	93.6	95.9	
4-Bromofluorobenzene	460-00-4	2	%	98.4	100	100	103	102	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4_020518	GW-D8_020518	WQA01_020518	WQA02_020518	D2_020518
Client sampling date / time				02-May-2018 13:42	02-May-2018 09:00	02-May-2018 09:33	02-May-2018 12:40	02-May-2018 12:19	
Compound	CAS Number	LOR	Unit	EP1805453-006	EP1805453-007	EP1805453-008	EP1805453-009	EP1805453-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.40	0.26	0.05	----	0.22	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.002	----	0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	----	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	0.003	
Manganese	7439-96-5	0.001	mg/L	<0.001	0.003	0.010	----	0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.001	0.001	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.11	0.09	0.08	----	0.05	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	0.07	<0.01	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	----	----	0.026	<0.001	----	
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	----	----	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	----	----	0.16	<0.05	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	<2	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.11	<0.01	----	0.06	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	4.33	<0.01	<0.01	----	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	4.33	<0.01	<0.01	----	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.8	3.9	----	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	5.1	0.8	3.9	----	0.6	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D4_020518	GW-D8_020518	WQA01_020518	WQA02_020518	D2_020518
Client sampling date / time				02-May-2018 13:42	02-May-2018 09:00	02-May-2018 09:33	02-May-2018 12:40	02-May-2018 12:19	
Compound	CAS Number	LOR	Unit	EP1805453-006	EP1805453-007	EP1805453-008	EP1805453-009	EP1805453-010	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.07	----	0.10	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.02	<0.01	----	<0.01	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	----	----	17	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	113	128	131	86.5	128	
Toluene-D8	2037-26-5	2	%	97.0	91.3	90.0	78.7	93.8	
4-Bromofluorobenzene	460-00-4	2	%	98.3	101	99.6	93.4	104	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			D1_020518	----	----	----	----
Client sampling date / time		02-May-2018 12:46			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1805453-011	-----	-----	-----	-----	
				Result	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.07	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.003	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.73	----	----	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	----	----	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	----	----	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.08	----	----	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.08	----	----	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	----	----	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.2	----	----	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	----	----	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	----	----	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	----	----	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	----	----	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	----	----	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID		D1_020518	----	----	----	----
Client sampling date / time		02-May-2018 12:46		----	----	----	----	----
Compound	CAS Number	LOR	Unit	EP1805453-011	-----	-----	-----	-----
				Result	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons - Continued								
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	----	----	----	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
C6 - C10 Fraction	C6_C10	20	µg/L	<20	----	----	----	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	----	----	----	----
>C10 - C16 Fraction	----	100	µg/L	<100	----	----	----	----
>C16 - C34 Fraction	----	100	µg/L	<100	----	----	----	----
>C34 - C40 Fraction	----	100	µg/L	<100	----	----	----	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	----	----	----	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	----	----	----	----
EP080: BTEXN								
Benzene	71-43-2	1	µg/L	<1	----	----	----	----
Toluene	108-88-3	2	µg/L	<2	----	----	----	----
Ethylbenzene	100-41-4	2	µg/L	<2	----	----	----	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	----	----	----	----
ortho-Xylene	95-47-6	2	µg/L	<2	----	----	----	----
^ Total Xylenes	----	2	µg/L	<2	----	----	----	----
^ Sum of BTEX	----	1	µg/L	<1	----	----	----	----
Naphthalene	91-20-3	5	µg/L	<5	----	----	----	----
EP080S: TPH(V)/BTEX Surrogates								
1,2-Dichloroethane-D4	17060-07-0	2	%	112	----	----	----	----
Toluene-D8	2037-26-5	2	%	97.4	----	----	----	----
4-Bromofluorobenzene	460-00-4	2	%	99.1	----	----	----	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order : EP1805524 Client : MRIA Contact : Klinton Breese Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : MRIA - R8 Rehab Order number : W81020-103 C-O-C number : ---- Sampler : Danielle Sullivan Site : ---- Quote number : EP/840/17 No. of samples received : 10 No. of samples analysed : 10	Page : 1 of 8 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 03-May-2018 17:30 Date Analysis Commenced : 03-May-2018 Issue Date : 14-May-2018 21:06
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This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Orc Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_030518	T4B_030518	T3C_030518	T4C_030518	GW-D5_030518
Client sampling date / time				03-May-2018 10:19	03-May-2018 09:06	03-May-2018 11:23	03-May-2018 09:44	03-May-2018 12:00	
Compound	CAS Number	LOR	Unit	EP1805524-001	EP1805524-002	EP1805524-003	EP1805524-004	EP1805524-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.13	0.22	0.01	0.03	0.78	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.003	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.005	0.004	0.013	0.006	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.94	0.08	1.03	4.36	0.77	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.79	0.06	0.20	0.05	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	<0.01	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.9	<0.1	0.3	0.7	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.2	0.9	<0.1	0.3	0.7	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.42	<0.01	<0.01	<0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.29	<0.01	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3B_030518	T4B_030518	T3C_030518	T4C_030518	GW-D5_030518
Client sampling date / time				03-May-2018 10:19	03-May-2018 09:06	03-May-2018 11:23	03-May-2018 09:44	03-May-2018 12:00	
Compound	CAS Number	LOR	Unit	EP1805524-001	EP1805524-002	EP1805524-003	EP1805524-004	EP1805524-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	90.4	100	111	96.9	101	
Toluene-D8	2037-26-5	2	%	102	95.2	91.7	96.0	94.2	
4-Bromofluorobenzene	460-00-4	2	%	96.2	93.7	95.5	94.5	96.8	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			GW-T3E-A_030518	WQA01_030518	WQA03_030518	KA_030518	BH10_030518	
Client sampling date / time		03-May-2018 12:59			03-May-2018 00:00		03-May-2018 00:00		03-May-2018 14:02	03-May-2018 10:45
Compound	CAS Number	LOR	Unit	EP1805524-006	EP1805524-007	EP1805524-008	EP1805524-009	EP1805524-010		
				Result	Result	Result	Result	Result		
EA005P: pH by PC Titrator										
pH Value	----	0.01	pH Unit	----	----	----	6.56	----		
EA010P: Conductivity by PC Titrator										
Electrical Conductivity @ 25°C	----	1	µS/cm	----	----	----	178	----		
EA015: Total Dissolved Solids dried at 180 ± 5 °C										
Total Dissolved Solids @180°C	----	10	mg/L	----	----	----	138	----		
EA041: Colour (True)										
Colour (True)	----	1	PCU	----	----	----	<1	----		
pH Colour	----	0.01	pH Unit	----	----	----	6.90	----		
EA075: Redox Potential										
Redox Potential	----	0.1	mV	----	----	----	44.7	----		
pH Redox	----	0.01	pH Unit	----	----	----	6.83	----		
ED037P: Alkalinity by PC Titrator										
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	----	----	----	<1	----		
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	----	----	----	<1	----		
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	----	----	----	10	----		
Total Alkalinity as CaCO3	----	1	mg/L	----	----	----	10	----		
ED038A: Acidity										
Acidity as CaCO3	----	1	mg/L	----	----	----	7	----		
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA										
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	----	----	----	19	----		
ED045G: Chloride by Discrete Analyser										
Chloride	16887-00-6	1	mg/L	----	----	----	14	----		
ED093F: Dissolved Major Cations										
Calcium	7440-70-2	1	mg/L	----	----	----	6	----		
Magnesium	7439-95-4	1	mg/L	----	----	----	4	----		
Sodium	7440-23-5	1	mg/L	----	----	----	21	----		
Potassium	7440-09-7	1	mg/L	----	----	----	2	----		
EG020F: Dissolved Metals by ICP-MS										
Aluminium	7429-90-5	0.01	mg/L	0.32	0.32	----	----	0.23		
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	0.002		
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	<0.0001		
Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	----	----	<0.001		
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	<0.001		



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A_030518	WQA01_030518	WQA03_030518	KA_030518	BH10_030518
Client sampling date / time				03-May-2018 12:59	03-May-2018 00:00	03-May-2018 00:00	03-May-2018 14:02	03-May-2018 10:45	
Compound	CAS Number	LOR	Unit	EP1805524-006	EP1805524-007	EP1805524-008	EP1805524-009	EP1805524-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS - Continued									
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.006	0.006	----	----	0.013	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	<0.005	
Iron	7439-89-6	0.05	mg/L	0.29	0.30	----	----	1.89	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	<0.01	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	----	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	----	<0.001	----	----	
Manganese	7439-96-5	0.001	mg/L	----	----	<0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	----	<0.001	----	----	
Zinc	7440-66-6	0.005	mg/L	----	----	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	----	<0.05	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	----	----	<2	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	<2	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.35	0.33	----	----	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	----	----	0.08	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	----	----	0.08	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.7	----	----	0.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.9	0.7	----	----	0.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.05	0.03	----	----	0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.02	----	----	<0.01	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-T3E-A_030518	WQA01_030518	WQA03_030518	KA_030518	BH10_030518
Client sampling date / time				03-May-2018 12:59	03-May-2018 00:00	03-May-2018 00:00	03-May-2018 14:02	03-May-2018 10:45	
Compound	CAS Number	LOR	Unit	EP1805524-006	EP1805524-007	EP1805524-008	EP1805524-009	EP1805524-010	
				Result	Result	Result	Result	Result	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	----	----	----	0.99	----	
Total Cations	----	0.01	meq/L	----	----	----	1.59	----	
EP025: Oxygen - Dissolved (DO)									
Dissolved Oxygen	----	0.1	mg/L	----	----	----	8.1	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	102	110	81.8	----	108	
Toluene-D8	2037-26-5	2	%	93.3	92.2	100	----	95.8	
4-Bromofluorobenzene	460-00-4	2	%	98.2	96.4	98.4	----	93.6	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order	: EP1806724	Page	: 1 of 5
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 31-May-2018 17:20
Order number	: W81020-103	Date Analysis Commenced	: 31-May-2018
C-O-C number	: ----	Issue Date	: 11-Jun-2018 16:50
Sampler	: ----		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 5		
No. of samples analysed	: 5		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Orc Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- EG020 : It is recognised that total concentration is less than dissolved for some metal analytes. However, the difference is within experimental variation of the methods.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_31_05_18	A2_31_05_18	A2S_31_05_18	WQA02_31_05_18	WQA03_31_05_18
Client sampling date / time				31-May-2018 10:49	31-May-2018 11:06	31-May-2018 10:44	31-May-2018 00:00	31-May-2018 10:26	
Compound	CAS Number	LOR	Unit	EP1806724-001	EP1806724-002	EP1806724-003	EP1806724-004	EP1806724-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.02	0.02	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.002	0.002	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.003	0.004	0.003	0.004	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.06	0.06	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.05	0.12	0.05	0.06	<0.01	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.018	0.026	0.018	0.020	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.15	0.35	0.13	0.16	<0.05	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.02	<0.01	<0.01	0.02	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.02	<0.01	<0.01	0.02	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.7	2.8	2.7	2.6	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	2.7	2.8	2.7	2.6	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_31_05_18	A2_31_05_18	A2S_31_05_18	WQA02_31_05_18	WQA03_31_05_18
Client sampling date / time				31-May-2018 10:49	31-May-2018 11:06	31-May-2018 10:44	31-May-2018 00:00	31-May-2018 10:26	
Compound	CAS Number	LOR	Unit	EP1806724-001	EP1806724-002	EP1806724-003	EP1806724-004	EP1806724-005	
				Result	Result	Result	Result	Result	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.06	0.09	0.05	0.06	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	30	18	12	20	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	84.0	96.1	103	90.9	95.7	
Toluene-D8	2037-26-5	2	%	104	101	96.2	98.6	96.4	
4-Bromofluorobenzene	460-00-4	2	%	94.9	96.7	98.8	94.9	96.5	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order	: EP1806777	Page	: 1 of 4
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MDC	Date Samples Received	: 01-Jun-2018 17:15
Order number	: W81020-103	Date Analysis Commenced	: 06-Jun-2018
C-O-C number	: ----	Issue Date	: 08-Jun-2018 16:37
Sampler	: LF		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Orc Metals conducted by ALS Sydney, NATA accreditation no. 825, site no 10911.
- TDS by method EA-015 may bias high due to the presence of fine particulate matter, which may pass through the prescribed GF/C paper.
- Sodium Adsorption Ratio (where reported): Where results for Na, Ca or Mg are <LOR, a concentration at half the reported LOR is incorporated into the SAR calculation. This represents a conservative approach for Na relative to the assumption that <LOR = zero concentration and a conservative approach for Ca & Mg relative to the assumption that <LOR is equivalent to the LOR concentration.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)		Client sample ID			PB-East	----	----	----	----
Client sampling date / time		01-Jun-2018 16:00			----	----	----	----	
Compound	CAS Number	LOR	Unit	EP1806777-001	-----	-----	-----	-----	
				Result	----	----	----	----	
EA005P: pH by PC Titrator									
pH Value	----	0.01	pH Unit	6.64	----	----	----	----	
EA010P: Conductivity by PC Titrator									
Electrical Conductivity @ 25°C	----	1	µS/cm	219	----	----	----	----	
EA015: Total Dissolved Solids dried at 180 ± 5 °C									
Total Dissolved Solids @180°C	----	10	mg/L	164	----	----	----	----	
ED037P: Alkalinity by PC Titrator									
Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	----	----	----	----	
Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	30	----	----	----	----	
Total Alkalinity as CaCO3	----	1	mg/L	30	----	----	----	----	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA									
Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	15	----	----	----	----	
ED045G: Chloride by Discrete Analyser									
Chloride	16887-00-6	1	mg/L	38	----	----	----	----	
ED093F: Dissolved Major Cations									
Calcium	7440-70-2	1	mg/L	11	----	----	----	----	
Magnesium	7439-95-4	1	mg/L	4	----	----	----	----	
Sodium	7440-23-5	1	mg/L	23	----	----	----	----	
Potassium	7440-09-7	1	mg/L	2	----	----	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.21	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	0.009	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	0.001	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	0.015	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	0.54	----	----	----	----	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	----	----	----	----	
EN055: Ionic Balance									
Total Anions	----	0.01	meq/L	1.98	----	----	----	----	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	PB-East	----	----	----	----
				Client sampling date / time	01-Jun-2018 16:00	----	----	----	----
Compound	CAS Number	LOR	Unit		EP1806777-001	-----	-----	-----	-----
				Result		----	----	----	----
EN055: Ionic Balance - Continued									
Total Cations	----	0.01	meq/L		1.93	----	----	----	----

CERTIFICATE OF ANALYSIS

Work Order : EP1806776 Amendment : 1 Client : MRIA Contact : Chris McGraghan Address : 202 Pier Street Perth, Western Australia 6000 Telephone : ---- Project : 60478410 Order number : W81020-103 C-O-C number : ---- Sampler : Tim Williamson Site : ---- Quote number : EP/840/17 No. of samples received : 13 No. of samples analysed : 13	Page : 1 of 9 Laboratory : Environmental Division Perth Contact : Brandon Ovens Address : 26 Rigali Way Wangara WA Australia 6065 Telephone : 08 9406 1328 Date Samples Received : 01-Jun-2018 17:10 Date Analysis Commenced : 01-Jun-2018 Issue Date : 12-Jun-2018 12:18
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Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

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Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

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Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EK061G/EK067G (TKN/TP): LOR for sample 'BH12_01_06_18' raised due to possible sample matrix interference.
- Amendment (12/06/2018): This report has been amended to alter the client code. All analysis results are as per the previous report.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_01_06_18	GW-D4_01_06_18	GW-D5_01_06_18	GW-D8_01_06_18	T3B_01_06_18
Client sampling date / time				01-Jun-2018 09:00	01-Jun-2018 09:50	01-Jun-2018 00:00	01-Jun-2018 10:45	01-Jun-2018 12:50	
Compound	CAS Number	LOR	Unit	EP1806776-001	EP1806776-002	EP1806776-003	EP1806776-004	EP1806776-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.40	0.44	0.16	0.16	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.002	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.008	<0.001	0.001	0.002	0.005	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	0.001	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.80	0.10	0.95	0.07	0.97	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.02	0.08	0.11	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.35	0.67	0.02	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.35	0.67	0.02	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.6	0.5	0.7	0.2	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	1.3	0.5	0.7	0.2	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	<0.01	0.05	0.01	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.02	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_01_06_18	GW-D4_01_06_18	GW-D5_01_06_18	GW-D8_01_06_18	T3B_01_06_18
Client sampling date / time					01-Jun-2018 09:00	01-Jun-2018 09:50	01-Jun-2018 00:00	01-Jun-2018 10:45	01-Jun-2018 12:50
Compound	CAS Number	LOR	Unit	EP1806776-001	EP1806776-002	EP1806776-003	EP1806776-004	EP1806776-005	EP1806776-005
				Result	Result	Result	Result	Result	Result
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	<20
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	<100
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	98.7	110	94.2	124	128	128
Toluene-D8	2037-26-5	2	%	78.5	74.6	87.2	88.9	86.7	86.7
4-Bromofluorobenzene	460-00-4	2	%	83.3	80.1	87.1	82.2	85.3	85.3



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3C_01_06_18	BH10_01_06_18	BH12_01_06_18	GW-T3E-A_01_06_18	WQA01_01_06_18
Client sampling date / time				01-Jun-2018 13:45	01-Jun-2018 13:16	01-Jun-2018 08:04	01-Jun-2018 14:41	01-Jun-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1806776-006	EP1806776-007	EP1806776-008	EP1806776-009	EP1806776-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	0.19	<0.01	0.34	0.32	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.012	0.008	0.020	0.006	0.007	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.016	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.95	1.08	<0.05	0.47	0.48	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.03	0.02	0.36	0.35	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	0.08	3.22	<0.01	<0.01	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.08	3.22	<0.01	<0.01	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.6	0.6	0.6	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	3.8	0.6	0.6	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	<0.01	0.03	<0.02	0.07	0.07	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	<0.01	0.05	0.05	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	100	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T3C_01_06_18	BH10_01_06_18	BH12_01_06_18	GW-T3E-A_01_06_18	WQA01_01_06_18
Client sampling date / time				01-Jun-2018 13:45	01-Jun-2018 13:16	01-Jun-2018 08:04	01-Jun-2018 14:41	01-Jun-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1806776-006	EP1806776-007	EP1806776-008	EP1806776-009	EP1806776-010	
				Result	Result	Result	Result	Result	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	100	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
[^] Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
[^] Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	78.0	88.6	136	124	110	
Toluene-D8	2037-26-5	2	%	75.6	87.8	91.0	73.6	75.9	
4-Bromofluorobenzene	460-00-4	2	%	82.4	81.6	87.1	80.5	82.4	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA03_01_06_18	D1_01_06_18	D2_01_06_18	----	----
Client sampling date / time				01-Jun-2018 00:00	01-Jun-2018 11:49	01-Jun-2018 11:20	----	----	
Compound	CAS Number	LOR	Unit	EP1806776-011	EP1806776-012	EP1806776-013	-----	-----	
				Result	Result	Result	----	----	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	0.06	0.26	----	----	
Arsenic	7440-38-2	0.001	mg/L	----	<0.001	0.001	----	----	
Cadmium	7440-43-9	0.0001	mg/L	----	<0.0001	<0.0001	----	----	
Chromium	7440-47-3	0.001	mg/L	----	<0.001	0.001	----	----	
Copper	7440-50-8	0.001	mg/L	----	<0.001	<0.001	----	----	
Lead	7439-92-1	0.001	mg/L	----	<0.001	0.005	----	----	
Manganese	7439-96-5	0.001	mg/L	----	0.003	0.001	----	----	
Nickel	7440-02-0	0.001	mg/L	----	<0.001	<0.001	----	----	
Selenium	7782-49-2	0.01	mg/L	----	<0.01	<0.01	----	----	
Zinc	7440-66-6	0.005	mg/L	----	<0.005	<0.005	----	----	
Iron	7439-89-6	0.05	mg/L	----	0.51	0.06	----	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	<0.01	----	----	----	----	
Arsenic	7440-38-2	0.001	mg/L	<0.001	----	----	----	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	----	----	----	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	----	----	----	----	
Copper	7440-50-8	0.001	mg/L	<0.001	----	----	----	----	
Lead	7439-92-1	0.001	mg/L	<0.001	----	----	----	----	
Manganese	7439-96-5	0.001	mg/L	<0.001	----	----	----	----	
Nickel	7440-02-0	0.001	mg/L	<0.001	----	----	----	----	
Selenium	7782-49-2	0.01	mg/L	<0.01	----	----	----	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	----	----	----	----	
Iron	7439-89-6	0.05	mg/L	<0.05	----	----	----	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	----	0.03	0.07	----	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	----	<0.01	<0.01	----	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	----	0.42	<0.01	----	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	----	0.42	<0.01	----	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	----	<0.1	0.7	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	WQA03_01_06_18	D1_01_06_18	D2_01_06_18	----	----
Client sampling date / time				01-Jun-2018 00:00	01-Jun-2018 11:49	01-Jun-2018 11:20	----	----	
Compound	CAS Number	LOR	Unit	EP1806776-011	EP1806776-012	EP1806776-013	-----	-----	
				Result	Result	Result	----	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	----	0.4	0.7	----	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	----	<0.01	0.01	----	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	----	<0.01	<0.01	----	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	----	----	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	----	----	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	----	----	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	----	----	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	----	----	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	----	----	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	<2	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	----	----	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	----	----	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	114	121	91.0	----	----	
Toluene-D8	2037-26-5	2	%	75.9	74.9	89.7	----	----	
4-Bromofluorobenzene	460-00-4	2	%	80.8	81.4	87.2	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125



CERTIFICATE OF ANALYSIS

Work Order : EP1807736

Client : MRIA

Contact : Chris McGraghan

**Address : 202 Pier Street
Perth, Western Australia 6000**

Telephone : ----

Project : MRIA (Roe 8 Rehab)

Order number : W81020-103

C-O-C number : ----

Sampler : D. Sullivan

Site : ----

Quote number : EP/840/17

No. of samples received : 12

No. of samples analysed : 9

Page : 1 of 7

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 26 Rigali Way Wangara WA Australia 6065

Telephone : 08 9406 1328

Date Samples Received : 27-Jun-2018 17:50

Date Analysis Commenced : 27-Jun-2018

Issue Date : 04-Jul-2018 22:57



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5_27_06_18	T3B_27_06_18	T4B_27_06_18	T4C_27_06_18	D2_27_06_18
Client sampling date / time				27-Jun-2018 10:02	27-Jun-2018 11:38	27-Jun-2018 12:16	27-Jun-2018 12:41	27-Jun-2018 08:21	
Compound	CAS Number	LOR	Unit	EP1807736-001	EP1807736-002	EP1807736-003	EP1807736-004	EP1807736-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.54	0.91	0.20	0.02	0.19	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	<0.001	<0.001	0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	0.003	
Manganese	7439-96-5	0.001	mg/L	<0.001	0.003	0.006	0.005	0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.14	0.58	0.08	4.15	<0.05	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.02	0.88	0.19	0.04	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.49	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	0.49	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.1	1.0	0.3	0.5	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.5	0.1	1.0	0.3	1.0	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.03	0.02	0.24	<0.01	0.03	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	<0.01	0.24	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D5_27_06_18	T3B_27_06_18	T4B_27_06_18	T4C_27_06_18	D2_27_06_18
Client sampling date / time					27-Jun-2018 10:02	27-Jun-2018 11:38	27-Jun-2018 12:16	27-Jun-2018 12:41	27-Jun-2018 08:21
Compound	CAS Number	LOR	Unit	EP1807736-001	EP1807736-002	EP1807736-003	EP1807736-004	EP1807736-005	
				Result	Result	Result	Result	Result	
EP080/071: Total Petroleum Hydrocarbons - Continued									
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	<20
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	<100
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	<1
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	<2
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	<2
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	<2
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	<2
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	<2
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	<1
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	89.4	70.0	86.4	69.2	78.8	
Toluene-D8	2037-26-5	2	%	97.6	102	99.1	104	100	
4-Bromofluorobenzene	460-00-4	2	%	99.6	93.0	98.4	94.5	96.2	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1_27_06_18	GW-T3E-A_27_06_18	WQA01_27_06_18	WQA03_27_06_18	----
Client sampling date / time					27-Jun-2018 08:46	27-Jun-2018 09:17	27-Jun-2018 00:00	27-Jun-2018 00:00	----
Compound	CAS Number	LOR	Unit	EP1807736-006	EP1807736-007	EP1807736-008	EP1807736-009	-----	----
				Result	Result	Result	Result	-----	----
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.28	0.31	----	-----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	----	-----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	----	-----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	0.003	0.002	----	-----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	----	-----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	----	-----	----
Manganese	7439-96-5	0.001	mg/L	<0.001	0.005	0.006	----	-----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.001	----	-----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	----	-----	----
Iron	7439-89-6	0.05	mg/L	<0.05	0.41	0.40	----	-----	----
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	----	----	----	<0.01	-----	----
Cadmium	7440-43-9	0.0001	mg/L	----	----	----	<0.0001	-----	----
Chromium	7440-47-3	0.001	mg/L	----	----	----	<0.001	-----	----
Manganese	7439-96-5	0.001	mg/L	----	----	----	<0.001	-----	----
Nickel	7440-02-0	0.001	mg/L	----	----	----	<0.001	-----	----
Zinc	7440-66-6	0.005	mg/L	----	----	----	<0.005	-----	----
Iron	7439-89-6	0.05	mg/L	----	----	----	<0.05	-----	----
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	----	-----	----
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	----	----	----	<2	-----	----
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.35	0.34	----	-----	----
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	0.02	<0.01	<0.01	----	-----	----
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.81	<0.01	<0.01	----	-----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.83	<0.01	<0.01	----	-----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.7	0.6	----	-----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	1.0	0.7	0.6	----	-----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	D1_27_06_18	GW-T3E-A_27_06_18	WQA01_27_06_18	WQA03_27_06_18	----
Client sampling date / time					27-Jun-2018 08:46	27-Jun-2018 09:17	27-Jun-2018 00:00	27-Jun-2018 00:00	----
Compound	CAS Number	LOR	Unit		EP1807736-006	EP1807736-007	EP1807736-008	EP1807736-009	-----
					Result	Result	Result	Result	----
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L		0.02	0.06	0.05	----	----
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L		<0.01	0.05	0.05	----	----
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L		<20	<20	<20	<20	----
C10 - C14 Fraction	----	50	µg/L		<50	<50	<50	<50	----
C15 - C28 Fraction	----	100	µg/L		<100	<100	<100	<100	----
C29 - C36 Fraction	----	50	µg/L		<50	<50	<50	<50	----
^ C10 - C36 Fraction (sum)	----	50	µg/L		<50	<50	<50	<50	----
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L		<20	<20	<20	<20	----
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L		<20	<20	<20	<20	----
>C10 - C16 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C16 - C34 Fraction	----	100	µg/L		<100	<100	<100	<100	----
>C34 - C40 Fraction	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C40 Fraction (sum)	----	100	µg/L		<100	<100	<100	<100	----
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L		<100	<100	<100	<100	----
EP080: BTEXN									
Benzene	71-43-2	1	µg/L		<1	<1	<1	<1	----
Toluene	108-88-3	2	µg/L		<2	<2	<2	<2	----
Ethylbenzene	100-41-4	2	µg/L		<2	<2	<2	<2	----
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L		<2	<2	<2	<2	----
ortho-Xylene	95-47-6	2	µg/L		<2	<2	<2	<2	----
^ Total Xylenes	----	2	µg/L		<2	<2	<2	<2	----
^ Sum of BTEX	----	1	µg/L		<1	<1	<1	<1	----
Naphthalene	91-20-3	5	µg/L		<5	<5	<5	<5	----
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%		67.4	74.4	130	69.0	----
Toluene-D8	2037-26-5	2	%		105	101	84.9	106	----
4-Bromofluorobenzene	460-00-4	2	%		92.0	96.7	112	93.7	----



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

CERTIFICATE OF ANALYSIS

Work Order	: EP1807774	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 28-Jun-2018 16:00
Order number	: W81020-103	Date Analysis Commenced	: 28-Jun-2018
C-O-C number	: ----	Issue Date	: 05-Jul-2018 13:24
Sampler	: D Sullivan		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
∅ = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- EG020: It is recognised that total nickel is less than dissolved nickel for sample 'BLNS-B1_28_06_18'. However, the difference is within experimental variation of the methods.
- EK061G/EK067G (TKN/TP): LOR for sample EP1807774-005 raised due to possible sample matrix interference.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_28_06_18	GW-D4_28_06_18	GW-D8_28_06_18	BH10_28_06_18	BH12_28_06_18
Client sampling date / time				28-Jun-2018 08:11	28-Jun-2018 10:59	28-Jun-2018 10:16	28-Jun-2018 11:27	28-Jun-2018 07:36	
Compound	CAS Number	LOR	Unit	EP1807774-001	EP1807774-002	EP1807774-003	EP1807774-004	EP1807774-005	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.28	0.14	0.07	<0.01	
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.001	<0.001	<0.001	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.009	<0.001	0.001	<0.001	0.017	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.001	<0.001	0.002	
Zinc	7440-66-6	0.005	mg/L	0.008	<0.005	<0.005	<0.005	0.014	
Iron	7439-89-6	0.05	mg/L	0.59	0.16	<0.05	<0.05	<0.05	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	<2	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.02	0.10	0.06	0.02	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.26	0.20	0.07	0.13	2.91	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.26	0.20	0.07	0.13	2.91	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	1.8	0.6	0.4	0.4	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									
^ Total Nitrogen as N	----	0.1	mg/L	0.6	2.0	0.7	0.5	3.3	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.02	0.06	0.06	0.07	<0.02	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.02	<0.01	<0.01	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	GW-D3_28_06_18	GW-D4_28_06_18	GW-D8_28_06_18	BH10_28_06_18	BH12_28_06_18	
Client sampling date / time				28-Jun-2018 08:11	28-Jun-2018 10:59	28-Jun-2018 10:16	28-Jun-2018 11:27	28-Jun-2018 07:36		
Compound	CAS Number	LOR	Unit	EP1807774-001	EP1807774-002	EP1807774-003	EP1807774-004	EP1807774-005		
				Result	Result	Result	Result	Result		
EP080/071: Total Petroleum Hydrocarbons - Continued										
^ C10 - C36 Fraction (sum)				----	50	µg/L	<50	<50	<50	<50
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions										
C6 - C10 Fraction				C6_C10	20	µg/L	<20	<20	<20	<20
^ C6 - C10 Fraction minus BTEX (F1)				C6_C10-BTEX	20	µg/L	<20	<20	<20	<20
>C10 - C16 Fraction				----	100	µg/L	<100	<100	<100	<100
>C16 - C34 Fraction				----	100	µg/L	<100	<100	<100	<100
>C34 - C40 Fraction				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C40 Fraction (sum)				----	100	µg/L	<100	<100	<100	<100
^ >C10 - C16 Fraction minus Naphthalene (F2)				----	100	µg/L	<100	<100	<100	<100
EP080: BTEXN										
Benzene				71-43-2	1	µg/L	<1	<1	<1	<1
Toluene				108-88-3	2	µg/L	<2	<2	<2	<2
Ethylbenzene				100-41-4	2	µg/L	<2	<2	<2	<2
meta- & para-Xylene				108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2
ortho-Xylene				95-47-6	2	µg/L	<2	<2	<2	<2
^ Total Xylenes				----	2	µg/L	<2	<2	<2	<2
^ Sum of BTEX				----	1	µg/L	<1	<1	<1	<1
Naphthalene				91-20-3	5	µg/L	<5	<5	<5	<5
EP080S: TPH(V)/BTEX Surrogates										
1,2-Dichloroethane-D4				17060-07-0	2	%	113	118	114	120
Toluene-D8				2037-26-5	2	%	98.3	96.7	93.2	97.0
4-Bromofluorobenzene				460-00-4	2	%	104	106	104	105



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_28_06_18	A2_28_06_18	A2S_28_06_18	WQA02_28_06_18	WQA03_28_06_18
Client sampling date / time				28-Jun-2018 09:00	28-Jun-2018 09:17	28-Jun-2018 08:55	28-Jun-2018 00:00	28-Jun-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1807774-006	EP1807774-007	EP1807774-008	EP1807774-009	EP1807774-010	
				Result	Result	Result	Result	Result	
EG020F: Dissolved Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.02	0.02	----	
Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.002	0.002	----	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	----	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	----	
Manganese	7439-96-5	0.001	mg/L	0.036	0.030	0.035	0.034	----	
Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	<0.001	<0.001	----	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	----	
Iron	7439-89-6	0.05	mg/L	0.14	0.13	0.15	0.14	----	
EG020T: Total Metals by ICP-MS									
Aluminium	7429-90-5	0.01	mg/L	0.04	0.03	0.04	0.05	<0.01	
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Manganese	7439-96-5	0.001	mg/L	0.040	0.036	0.043	0.040	<0.001	
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	<0.001	<0.001	<0.001	
Selenium	7782-49-2	0.01	mg/L	----	----	----	----	<0.01	
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	
Iron	7439-89-6	0.05	mg/L	0.22	0.18	0.24	0.22	<0.05	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EG093T: Total Metals in Saline Water by ORC-ICPMS									
Selenium	7782-49-2	2	µg/L	<2	<2	<2	<2	----	
EK055G: Ammonia as N by Discrete Analyser									
Ammonia as N	7664-41-7	0.01	mg/L	0.56	0.38	0.55	0.53	----	
EK057G: Nitrite as N by Discrete Analyser									
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	<0.01	<0.01	----	
EK058G: Nitrate as N by Discrete Analyser									
Nitrate as N	14797-55-8	0.01	mg/L	0.04	0.03	0.02	0.05	----	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser									
Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.03	0.02	0.05	----	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser									
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.3	2.0	2.4	2.4	----	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser									



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_28_06_18	A2_28_06_18	A2S_28_06_18	WQA02_28_06_18	WQA03_28_06_18
Client sampling date / time				28-Jun-2018 09:00	28-Jun-2018 09:17	28-Jun-2018 08:55	28-Jun-2018 00:00	28-Jun-2018 00:00	
Compound	CAS Number	LOR	Unit	EP1807774-006	EP1807774-007	EP1807774-008	EP1807774-009	EP1807774-010	
				Result	Result	Result	Result	Result	
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser - Continued									
^ Total Nitrogen as N	----	0.1	mg/L	2.3	2.0	2.4	2.4	----	
EK067G: Total Phosphorus as P by Discrete Analyser									
Total Phosphorus as P	----	0.01	mg/L	0.09	0.08	0.10	0.10	----	
EK071G: Reactive Phosphorus as P by discrete analyser									
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.03	0.05	0.04	----	
EP008: Chlorophyll a & Pheophytin a									
Chlorophyll a	----	1	mg/m ³	1	<1	1	<1	----	
EP080/071: Total Petroleum Hydrocarbons									
C6 - C9 Fraction	----	20	µg/L	<20	<20	<20	<20	<20	
C10 - C14 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
C15 - C28 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
C29 - C36 Fraction	----	50	µg/L	<50	<50	<50	<50	<50	
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	<50	<50	<50	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	<20	<20	<20	
^ C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	<20	<20	<20	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	<100	<100	<100	
^ >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	<100	<100	<100	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	<1	<1	<1	
Toluene	108-88-3	2	µg/L	<2	<2	<2	<2	<2	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	<2	<2	<2	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	<2	<2	<2	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	<2	<2	<2	
^ Total Xylenes	----	2	µg/L	<2	<2	<2	<2	<2	
^ Sum of BTEX	----	1	µg/L	<1	<1	<1	<1	<1	
Naphthalene	91-20-3	5	µg/L	<5	<5	<5	<5	<5	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	121	117	112	126	120	



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	BLNS-B1_28_06_18	A2_28_06_18	A2S_28_06_18	WQA02_28_06_18	WQA03_28_06_18
Client sampling date / time					28-Jun-2018 09:00	28-Jun-2018 09:17	28-Jun-2018 08:55	28-Jun-2018 00:00	28-Jun-2018 00:00
Compound	CAS Number	LOR	Unit	EP1807774-006	EP1807774-007	EP1807774-008	EP1807774-009	EP1807774-010	
				Result	Result	Result	Result	Result	
EP080S: TPH(V)/BTEX Surrogates - Continued									
Toluene-D8	2037-26-5	2	%	95.8	95.9	96.8	96.6	96.4	
4-Bromofluorobenzene	460-00-4	2	%	108	104	104	104	104	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125



CERTIFICATE OF ANALYSIS

Work Order : EP1806725

Amendment : 1

Client : MRIA

Contact : Chris McGraghan

Address : 202 Pier Street
Perth, Western Australia 6000

Telephone : ----

Project : 60478410

Order number : W81020-103

C-O-C number : ----

Sampler : Tim Williamson

Site : ----

Quote number : EP/840/17

No. of samples received : 2

No. of samples analysed : 2

Page : 1 of 5

Laboratory : Environmental Division Perth

Contact : Brandon Ovens

Address : 26 Rigali Way Wangara WA Australia 6065

Telephone : 08 9406 1328

Date Samples Received : 31-May-2018 17:20

Date Analysis Commenced : 31-May-2018

Issue Date : 13-Jun-2018 12:36



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Signatories	Position	Accreditation Category
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



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Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contact for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- Amendment (13/06/2018): This report has been amended to alter the client code. All analysis results are as per the previous report.



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID		T4B_31_05_18	T4C_31_05_18	----	----	----
Client sampling date / time				31-May-2018 09:28	31-May-2018 10:07	----	----	----	----	----
Compound	CAS Number	LOR	Unit	EP1806725-001	EP1806725-002	-----	-----	-----	-----	-----
				Result	Result	----	----	----	----	----
EG020F: Dissolved Metals by ICP-MS										
Aluminium	7429-90-5	0.01	mg/L	0.22	0.02	----	----	----	----	----
Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	----	----	----	----	----
Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Manganese	7439-96-5	0.001	mg/L	0.005	0.008	----	----	----	----	----
Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	----	----	----	----	----
Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	----	----	----	----	----
Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	----	----	----	----	----
Iron	7439-89-6	0.05	mg/L	0.10	4.01	----	----	----	----	----
EK055G: Ammonia as N by Discrete Analyser										
Ammonia as N	7664-41-7	0.01	mg/L	0.79	0.20	----	----	----	----	----
EK057G: Nitrite as N by Discrete Analyser										
Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	----	----	----	----	----
EK058G: Nitrate as N by Discrete Analyser										
Nitrate as N	14797-55-8	0.01	mg/L	0.01	<0.01	----	----	----	----	----
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser										
Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	----	----	----	----	----
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser										
Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.3	----	----	----	----	----
EK062G: Total Nitrogen as N (TKN + NOx) by Discrete Analyser										
^ Total Nitrogen as N	----	0.1	mg/L	0.9	0.3	----	----	----	----	----
EK067G: Total Phosphorus as P by Discrete Analyser										
Total Phosphorus as P	----	0.01	mg/L	0.25	<0.01	----	----	----	----	----
EK071G: Reactive Phosphorus as P by discrete analyser										
Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.25	<0.01	----	----	----	----	----
EP080/071: Total Petroleum Hydrocarbons										
C6 - C9 Fraction	----	20	µg/L	<20	<20	----	----	----	----	----
C10 - C14 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----
C15 - C28 Fraction	----	100	µg/L	<100	<100	----	----	----	----	----
C29 - C36 Fraction	----	50	µg/L	<50	<50	----	----	----	----	----
^ C10 - C36 Fraction (sum)	----	50	µg/L	<50	<50	----	----	----	----	----



Analytical Results

Sub-Matrix: WATER (Matrix: WATER)				Client sample ID	T4B_31_05_18	T4C_31_05_18	----	----	----
Client sampling date / time				31-May-2018 09:28	31-May-2018 10:07	----	----	----	
Compound	CAS Number	LOR	Unit	EP1806725-001	EP1806725-002	-----	-----	-----	
				Result	Result	----	----	----	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions									
C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	----	----	----	
[^] C6 - C10 Fraction minus BTEX (F1)	C6_C10-BTEX	20	µg/L	<20	<20	----	----	----	
>C10 - C16 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C16 - C34 Fraction	----	100	µg/L	<100	<100	----	----	----	
>C34 - C40 Fraction	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C40 Fraction (sum)	----	100	µg/L	<100	<100	----	----	----	
[^] >C10 - C16 Fraction minus Naphthalene (F2)	----	100	µg/L	<100	<100	----	----	----	
EP080: BTEXN									
Benzene	71-43-2	1	µg/L	<1	<1	----	----	----	
Toluene	108-88-3	2	µg/L	<2	<2	----	----	----	
Ethylbenzene	100-41-4	2	µg/L	<2	<2	----	----	----	
meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	----	----	----	
ortho-Xylene	95-47-6	2	µg/L	<2	<2	----	----	----	
[^] Total Xylenes	----	2	µg/L	<2	<2	----	----	----	
[^] Sum of BTEX	----	1	µg/L	<1	<1	----	----	----	
Naphthalene	91-20-3	5	µg/L	<5	<5	----	----	----	
EP080S: TPH(V)/BTEX Surrogates									
1,2-Dichloroethane-D4	17060-07-0	2	%	110	110	----	----	----	
Toluene-D8	2037-26-5	2	%	97.9	96.5	----	----	----	
4-Bromofluorobenzene	460-00-4	2	%	99.6	98.9	----	----	----	



Surrogate Control Limits

Sub-Matrix: WATER		Recovery Limits (%)	
Compound	CAS Number	Low	High
EP080S: TPH(V)/BTEX Surrogates			
1,2-Dichloroethane-D4	17060-07-0	61	141
Toluene-D8	2037-26-5	73	126
4-Bromofluorobenzene	460-00-4	60	125

QUALITY CONTROL REPORT

Work Order	: EP1706873	Page	: 1 of 8
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 28-Jun-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 28-Jun-2017
C-O-C number	: ----	Issue Date	: 05-Jul-2017
Sampler	: TIM WILLIAMSON		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 8		
No. of samples analysed	: 8		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 974524)									
EP1706873-007	WQA02_280617	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.013	0.013	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.14	0.14	0.00	No Limit
EP1706817-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.117	0.117	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 976328)									
EP1706873-004	BLNS-B1_	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 976328) - continued									
EP1706873-004	BLNS-B1_	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.024	0.024	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.04	0.07	44.6	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1706876-004	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	0.28	0.31	10.4	No Limit
		EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0047	0.0056	18.3	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.106	0.105	1.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	15.9	16.0	0.454	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.226	0.245	7.99	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.128	0.128	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.100	<0.100	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.44	<0.20	75.7	No Limit
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.20	<0.20	0.00	No Limit		
EG020A-T: Iron	7439-89-6	0.05	mg/L	2.22	2.28	2.59	No Limit		
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 970045)									
EP1706849-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	<0.01	68.4	No Limit
EP1706849-011	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 970044)									
EP1706851-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1706873-001	T3B_	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 970046)									
EP1706849-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	22.7	22.5	1.04	0% - 20%
EP1706849-011	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 973887)									
EP1706818-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	0.1	0.00	No Limit
EP1706873-002	T3C_	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 973886)									
EP1706818-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.06	17.4	No Limit
EP1706873-002	T3C_	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 970043)									
EP1706851-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1706873-001	T3B_	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 971131)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 971131) - continued										
EP1706873-004	BLNS-B1_	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP1706881-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 973791)										
EP1706869-022	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1706884-021	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 971131)										
EP1706873-004	BLNS-B1_	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP1706881-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 973791)										
EP1706869-022	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1706884-021	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 973791)										
EP1706869-022	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1706884-021	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 974524)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.5	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.3	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.4	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.1	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.1	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.7	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.4	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	92.7	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.8	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.7	84	112	
EG020T: Total Metals by ICP-MS (QCLot: 976328)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.2	84	103	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	104	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.4	84	101	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	85	101	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.6	83	98	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.1	86	99	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	97.5	85	102	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.4	83	100	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	92.8	83	112	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.2	84	109	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.8	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 970045)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 970044)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 970046)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	108	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 973887)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.9	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 973886)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.8	70	130	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 970043)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	87	115	
EP008: Chlorophyll (QCLot: 971424)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	95.0	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 971131)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	75.2	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	95.6	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	86.8	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 973791)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	88.8	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 971131)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	81.1	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	93.6	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	74.2	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 973791)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	91.2	74	115	
EP080: BTEXN (QCLot: 973791)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	85.4	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	98.5	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	106	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	108	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	110	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	95.2	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 974524)								
EP1706817-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	98.0	70	130	
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	94.2	70	130	
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	92.9	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	89.2	70	130	
		EG020A-F: Lead	7439-92-1	0.2 mg/L	91.0	70	130	
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	94.3	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 974524) - continued							
EP1706817-002	Anonymous	EG020A-F: Nickel	7440-02-0	0.2 mg/L	92.2	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.8	70	130
EG020T: Total Metals by ICP-MS (QCLot: 976328)							
EP1706818-005	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	100	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	109	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.2	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	86.4	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	98.8	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	98.6	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	99.8	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	106	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 970045)							
EP1706849-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	100	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 970044)							
EP1706851-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 970046)							
EP1706849-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	121	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 973887)							
EP1706818-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	94.1	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 973886)							
EP1706818-004	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	92.3	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 970043)							
EP1706851-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 971131)							
EP1706873-004	BLNS-B1_	EP071: C10 - C14 Fraction	----	400 µg/L	71.9	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	96.9	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	86.2	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 973791)							
EP1706873-001	T3B_	EP080: C6 - C9 Fraction	----	240 µg/L	133	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 971131)							
EP1706873-004	BLNS-B1_	EP071: >C10 - C16 Fraction	----	400 µg/L	78.2	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	94.9	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	77.3	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 973791)							
EP1706873-001	T3B_	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	125	77	137

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 Work Order : EP1706873
 Client : AECOM Australia Pty Ltd
 Project : 60478410



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 973791)							
EP1706873-001	T3B_	EP080: Benzene	71-43-2	20 µg/L	103	77	122
		EP080: Toluene	108-88-3	20 µg/L	96.7	74	126

QUALITY CONTROL REPORT

Work Order	: EP1706851	Page	: 1 of 9
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 27-Jun-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 28-Jun-2017
C-O-C number	: ----	Issue Date	: 03-Jul-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 12		
No. of samples analysed	: 12		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 971588)									
EP1706824-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.20	0.20	0.00	No Limit
EP1706820-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.017	0.017	0.00	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.033	0.034	3.45	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 971591)									
EP1706851-002	GW-D4_	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EG020F: Dissolved Metals by ICP-MS (QC Lot: 971591) - continued										
EP1706851-002	GW-D4_	EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit	
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit	
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.00	No Limit	
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1706851-010	WQA01_270617	EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit	
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit	
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit	
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.009	0.009	0.00	No Limit	
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.043	0.043	0.00	0% - 20%	
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.022	0.019	12.1	No Limit	
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.17	0.17	0.00	0% - 50%	
EG020T: Total Metals by ICP-MS (QC Lot: 973415)	EP1706812-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
			EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
			EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
			EG020A-T: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.00	No Limit
			EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
			EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
			EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
			EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.026	0.023	11.9	No Limit
			EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
			EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1706854-001	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit	
		EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit	
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.003	0.004	0.00	No Limit	
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.017	0.016	0.00	0% - 50%	
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.006	0.006	0.00	No Limit	
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.010	0.010	0.00	0% - 50%	
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.008	0.007	0.00	No Limit	
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.00	No Limit	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.032	0.034	5.46	No Limit			



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 973415) - continued									
EP1706854-001	Anonymous	EG020A-T: Aluminium	7429-90-5	0.01	mg/L	7.22	7.05	2.39	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	2.70	2.70	0.00	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 969865)									
EP1706851-001	GW-D3_	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.03	0.00	No Limit
EP1706851-010	WQA01_270617	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.22	0.22	0.00	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 970044)									
EP1706851-002	GW-D4_	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1706873-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 969866)									
EP1706851-001	GW-D3_	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.11	0.12	0.00	0% - 50%
EP1706851-010	WQA01_270617	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 969470)									
EP1706851-001	GW-D3_	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 969469)									
EP1706851-001	GW-D3_	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 970043)									
EP1706851-002	GW-D4_	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1706873-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 971089)									
EP1706851-005	GW-D8_	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 971237)									
EP1706851-001	GW-D3_	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1706851-005	GW-D8_	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 971089)									
EP1706851-005	GW-D8_	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 971237)									
EP1706851-001	GW-D3_	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1706851-005	GW-D8_	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 971237)									
EP1706851-001	GW-D3_	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 971237) - continued									
EP1706851-001	GW-D3_	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP1706851-005	GW-D8_	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 971588)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.7	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.2	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.9	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.6	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.4	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.0	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.0	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.3	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	84	112	
EG020F: Dissolved Metals by ICP-MS (QCLot: 971591)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	95.6	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.5	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.6	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.0	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.4	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.6	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	96.0	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	92.3	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	100	84	112	
EG020T: Total Metals by ICP-MS (QCLot: 973415)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	91.4	84	103	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.1	85	104	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.7	84	101	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.7	85	101	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	88.1	83	98	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.7	86	99	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.5	85	102	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	84.9	83	100	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	93.9	83	112	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.4	84	109	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020T: Total Metals by ICP-MS (QCLot: 973415) - continued									
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.4	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 969865)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 970044)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 969866)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	110	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 969470)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.3	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 969469)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 970043)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 971089)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	46.0	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	87.8	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	72.3	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 971237)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	99.6	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 971089)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	52.8	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	87.0	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	50.7	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 971237)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	99.0	74	115	
EP080: BTEXN (QCLot: 971237)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	86.8	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	95.3	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	94.6	84	113	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	40 µg/L	95.5	84	114	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	94.0	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	91.1	77	118	

Matrix Spike (MS) Report



The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
					Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 971588)							
EP1706820-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	97.0	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	104	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	94.9	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	89.9	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	87.0	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	92.1	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	91.1	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	94.7	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 971591)							
EP1706851-003	GW-D5_	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	89.8	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	94.3	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	87.6	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	91.6	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	93.6	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	89.1	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	92.0	70	130
EG020T: Total Metals by ICP-MS (QCLot: 973415)							
EP1706812-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	96.8	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.8	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	97.3	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	93.6	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	114	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	99.2	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	92.5	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	97.4	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 969865)							
EP1706835-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	105	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 970044)							
EP1706851-001	GW-D3_	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 969866)							
EP1706835-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 969470)							
EP1706851-003	GW-D5_	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	86.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 969469)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 969469) - continued							
EP1706851-003	GW-D5_	EK067G: Total Phosphorus as P	----	1 mg/L	103	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 970043)							
EP1706851-001	GW-D3_	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 971089)							
EP1706851-005	GW-D8_	EP071: C10 - C14 Fraction	----	400 µg/L	55.0	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	71.2	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	80.9	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 971089)							
EP1706851-005	GW-D8_	EP071: >C10 - C16 Fraction	----	400 µg/L	58.3	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	79.0	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	80.8	54	128

QUALITY CONTROL REPORT

Work Order	: EP1707992	Page	: 1 of 10
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: 6432 2000	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 26-Jul-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 27-Jul-2017
C-O-C number	: ----	Issue Date	: 01-Aug-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 11		
No. of samples analysed	: 11		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1025443)									
EP1707942-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	0.00	No Limit
EP1707984-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.038	0.038	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.010	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.02	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1025446)									
EP1707992-008	BH10_260717	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1025446) - continued									
EP1707992-008	BH10_260717	EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.009	0.009	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.026	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	1.40	1.44	2.68	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.25	1.29	3.35	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 1022731)									
EP1707746-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.014	0.014	0.00	0% - 50%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.014	0.013	9.73	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EP1707864-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1021357)									
EP1707988-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EP1707990-008	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.01	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1021360)									
EP1707992-007	T4B_260717	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.92	0.90	1.88	0% - 20%
EP1707996-007	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.32	0.30	3.55	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1021787)									



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1021787) - continued									
EP1707992-002	GW-D4_260717	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1708034-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1021358)									
EP1707988-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1707990-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1021359)									
EP1707992-007	T4B_260717	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1707996-007	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.13	2.12	0.00	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1025722)									
EP1707928-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.00	No Limit
EP1707942-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.4	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1025724)									
EP1707992-009	WQA01_260717	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.7	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1025721)									
EP1707928-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.02	<0.02	0.00	No Limit
EP1707942-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.03	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1025723)									
EP1707993-007	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.07	29.2	No Limit
EP1707992-009	WQA01_260717	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	0.06	19.6	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1021786)									
EP1707992-002	GW-D4_260717	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1708034-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1019995)									
EP1707992-004	GW-D8_260717	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1020012)									
EP1707930-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1707992-002	GW-D4_260717	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1019995)									
EP1707992-004	GW-D8_260717	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1020012)									
EP1707930-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1707992-002	GW-D4_260717	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1020012)									
EP1707930-004	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1020012) - continued									
EP1707930-004	Anonymous	EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
EP1707992-002	GW-D4_260717	EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1025443)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	108	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	101	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	100	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	112	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	111	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.9	84	112	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1025446)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.0	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	101	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.5	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	110	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	107	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	84	112	
EG020T: Total Metals by ICP-MS (QCLot: 1022731)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	84	103	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	85	104	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.8	84	101	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.9	85	101	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.6	83	98	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.6	86	99	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.7	85	102	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.3	83	100	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	105	83	112	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	84	109	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020T: Total Metals by ICP-MS (QCLot: 1022731) - continued									
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	82.4	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1021357)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	96.1	87	115	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1021360)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.6	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1021787)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	93.0	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1021358)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.6	92	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1021359)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.3	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1025722)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.9	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1025724)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	89.8	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1025721)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	87.8	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1025723)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1021786)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	107	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1019995)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	80.7	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	102	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	78.2	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1020012)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	97.6	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1019995)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	87.1	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	92.8	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	75.3	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1020012)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	98.2	74	115	
EP080: BTEXN (QCLot: 1020012)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	98.1	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	96.0	81	115	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080: BTEXN (QCLot: 1020012) - continued								
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	95.3	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	99.0	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	96.9	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	112	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1025443)							
EP1707942-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	125	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	113	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	97.5	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	109	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	107	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	103	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	115	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	120	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1025446)							
EP1707992-009	WQA01_260717	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	104	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	95.4	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	100	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	99.0	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.3	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	96.7	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	98.4	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	105	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1022731)							
EP1707746-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	104	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	102	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	94.8	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	95.3	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	92.0	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	92.5	70	130



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1022731) - continued							
EP1707746-002	Anonymous	EG020A-T: Nickel	7440-02-0	1 mg/L	96.2	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	107	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1021357)							
EP1707988-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	97.8	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1021360)							
EP1707992-006	T3C_260717	EK055G: Ammonia as N	7664-41-7	1 mg/L	96.9	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1021787)							
EP1707992-001	GW-D3_260717	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1021358)							
EP1707988-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1021359)							
EP1707992-006	T3C_260717	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	109	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1025722)							
EP1707928-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	93.5	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1025724)							
EP1707992-009	WQA01_260717	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1025721)							
EP1707928-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1025723)							
EP1707992-009	WQA01_260717	EK067G: Total Phosphorus as P	----	1 mg/L	98.6	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1021786)							
EP1707992-001	GW-D3_260717	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1019995)							
EP1707992-004	GW-D8_260717	EP071: C10 - C14 Fraction	----	400 µg/L	84.2	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	99.3	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	102	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1020012)							
EP1707923-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	86.9	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1019995)							
EP1707992-004	GW-D8_260717	EP071: >C10 - C16 Fraction	----	400 µg/L	88.6	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	101	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	115	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1020012)							
EP1707923-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	83.5	77	137

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 Work Order : EP1707992
 Client : AECOM Australia Pty Ltd
 Project : 60478410



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
				<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 1020012)							
EP1707923-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	95.7	77	122
		EP080: Toluene	108-88-3	20 µg/L	90.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1708050	Page	: 1 of 9
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: 6432 2000	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 27-Jul-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 28-Jul-2017
C-O-C number	: ----	Issue Date	: 07-Aug-2017
Sampler	: TIM WILLIAMSON		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 15		
No. of samples analysed	: 15		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1029627)									
EP1708050-001	GW-D5_270717	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.002	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.031	0.031	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.82	0.81	1.30	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.07	2.05	0.821	0% - 20%
EP1708050-011	FS2_270717	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.014	0.013	7.89	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.011	0.010	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.49	0.50	0.00	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	1.00	1.02	2.32	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 1027425)									
EP1708050-006	BLNS-B1_270717	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1027425) - continued									
EP1708050-006	BLNS-B1_270717	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.023	0.023	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.08	0.09	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1708080-003	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	0.45	0.46	0.00	No Limit
		EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.036	0.036	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.76	0.73	3.31	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.60	0.60	0.00	0% - 50%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1023904)									
EP1708042-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.05	0.00	No Limit
EP1708048-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	679	732	7.51	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1023906)									
EP1708050-003	T3C_270717	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.20	0.19	0.00	0% - 50%
EP1708050-012	RD1_270717	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.21	0.20	6.44	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1023859)									
EP1708050-002	T2F_270717	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1708050-011	FS2_270717	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1023905)									
EP1708042-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.00	No Limit
EP1708048-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.14	0.14	0.00	0% - 50%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1023907)									
EP1708050-003	T3C_270717	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1708050-012	RD1_270717	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.04	0.03	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1030979)									
EP1708050-001	GW-D5_270717	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.9	0.9	0.00	No Limit
EP1708050-011	FS2_270717	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.8	1.8	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1030978)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1030978) - continued									
EP1708050-001	GW-D5_270717	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.01	71.9	No Limit
EP1708050-011	FS2_270717	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.05	18.4	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1023858)									
EP1708050-002	T2F_270717	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	0.00	No Limit
EP1708050-011	FS2_270717	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1023226)									
EP1708058-007	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1025394)									
EP1708050-006	BLNS-B1_270717	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1025496)									
EP1708050-001	GW-D5_270717	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1708050-011	FS2_270717	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1023226)									
EP1708058-007	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1025394)									
EP1708050-006	BLNS-B1_270717	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1025496)									
EP1708050-001	GW-D5_270717	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1708050-011	FS2_270717	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1025496)									
EP1708050-001	GW-D5_270717	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1708050-011	FS2_270717	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

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 Work Order : EP1708050
 Client : AECOM Australia Pty Ltd
 Project : 60478410



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1025496) - continued									
EP1708050-011	FS2_270717	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1029627)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	84	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	103	84	108	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	86	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.8	85	109	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	93.2	84	110	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85	107	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	105	85	109	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.4	84	112	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	103	88	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.7	89	115	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	84	112	
EG020T: Total Metals by ICP-MS (QCLot: 1027425)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.6	84	103	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	85	104	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.5	84	101	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.6	85	101	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.8	83	98	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.8	86	99	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.7	85	102	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.4	83	100	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	105	83	112	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	103	84	109	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	91.0	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1023904)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	87	115	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1023906)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	106	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1023859)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1023905)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	92	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1023907)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	92	112	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1030979)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.0	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1030978)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.4	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1023858)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	111	87	115	
EP008: Chlorophyll (QCLot: 1032334)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	108	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1023226)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	83.3	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	80.7	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	77.6	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1025394)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	71.6	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	51.4	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	44.7	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1025496)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	96.9	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1023226)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	84.7	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	79.5	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	72.3	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1025394)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	71.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	46.2	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	34.1	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1025496)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	96.8	74	115	
EP080: BTEXN (QCLot: 1025496)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	106	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	101	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	100	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	101	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	105	77	118	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1029627)							
EP1708050-002	T2F_270717	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	101	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	101	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.0	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	94.6	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	98.2	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	98.0	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	95.8	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	100	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1027425)							
EP1708050-007	A2_270717	EG020A-T: Arsenic	7440-38-2	1 mg/L	106	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.5	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	97.7	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	95.1	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	92.4	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	92.7	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	96.7	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	103	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1023904)							
EP1708042-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	111	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1023906)							
EP1708050-002	T2F_270717	EK055G: Ammonia as N	7664-41-7	1 mg/L	99.8	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1023859)							
EP1708050-001	GW-D5_270717	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	98.1	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1023905)							
EP1708042-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	75.6	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1023907)							
EP1708050-002	T2F_270717	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	106	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1030979)							
EP1708050-002	T2F_270717	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1030978)							
EP1708050-002	T2F_270717	EK067G: Total Phosphorus as P	----	1 mg/L	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1023858)							
EP1708050-001	GW-D5_270717	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	109	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1023226)							
EP1708058-007	Anonymous	EP071: C10 - C14 Fraction	----	400 µg/L	75.8	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	72.7	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	63.7	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1025394)							
EP1708050-006	BLNS-B1_270717	EP071: C10 - C14 Fraction	----	400 µg/L	89.0	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	85.5	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	89.0	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1025496)							
EP1708050-002	T2F_270717	EP080: C6 - C9 Fraction	----	240 µg/L	97.6	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1023226)							
EP1708058-007	Anonymous	EP071: >C10 - C16 Fraction	----	400 µg/L	76.5	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	67.7	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	63.2	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1025394)							
EP1708050-006	BLNS-B1_270717	EP071: >C10 - C16 Fraction	----	400 µg/L	87.6	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	87.2	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	101	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1025496)							
EP1708050-002	T2F_270717	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	96.3	77	137
EP080: BTEXN (QCLot: 1025496)							
EP1708050-002	T2F_270717	EP080: Benzene	71-43-2	20 µg/L	96.3	77	122
		EP080: Toluene	108-88-3	20 µg/L	88.8	74	126

QUALITY CONTROL REPORT

Work Order	: EP1709130	Page	: 1 of 10
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 23-Aug-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 24-Aug-2017
C-O-C number	: ----	Issue Date	: 30-Aug-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 17		
No. of samples analysed	: 17		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1078181)									
EP1709106-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.057	0.058	2.21	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EP1709114-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.019	0.018	9.43	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.410	0.402	2.01	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.423	0.400	5.63	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	17.9	17.8	0.787	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.50	<0.50	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1078185)									
EP1709130-006	A1N_230817	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1078185) - continued									
EP1709130-006	A1N_230817	EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.777	0.772	0.727	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.05	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.69	0.68	1.74	0% - 50%
EP1709130-017	D2_230817	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.010	0.010	0.00	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.047	0.045	3.56	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.27	0.27	0.00	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.09	0.09	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1080112)									
EP1709048-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EP1709048-011	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1080112) - continued									
EP1709048-011	Anonymous	EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1080113)									
EP1709130-003	A2S_230817	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.032	0.032	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.06	0.07	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1709178-001	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	0.55	0.55	0.00	0% - 50%
		EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1073446)									
EP1709124-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1709130-008	FS4A_230817	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1073438)									
EP1709130-002	A2_230817	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.10	0.10	0.00	No Limit
EP1709130-011	S1_230817	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1073447)									
EP1709124-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.20	3.13	2.02	0% - 20%
EP1709130-008	FS4A_230817	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1075252)									
EP1709124-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.5	22.7	No Limit
EP1709130-008	FS4A_230817	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.5	1.3	11.5	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1075251)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1075251) - continued									
EP1709124-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.06	21.1	No Limit
EP1709130-008	FS4A_230817	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.16	0.16	0.00	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1073437)									
EP1709130-002	A2_230817	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.12	0.12	0.00	0% - 50%
EP1709130-011	S1_230817	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1074742)									
EP1709130-001	BLNS-B1_230817	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1075209)									
EP1709130-001	BLNS-B1_230817	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1709178-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1074742)									
EP1709130-001	BLNS-B1_230817	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1075209)									
EP1709130-001	BLNS-B1_230817	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1709178-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1075209)									
EP1709130-001	BLNS-B1_230817	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1709178-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1078181)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.0	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.0	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.4	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	100	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.1	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	106	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	107	84	120	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1078185)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.3	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.5	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.7	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.2	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	100.0	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	107	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	104	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	108	84	120	
EG020T: Total Metals by ICP-MS (QCLot: 1080112)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.0	84	120	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.5	84	120	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.5	85	120	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.8	83	120	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	86	120	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	85	120	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.0	83	120	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	104	83	120	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	84	120	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020T: Total Metals by ICP-MS (QCLot: 1080112) - continued									
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	116	77	120	
EG020T: Total Metals by ICP-MS (QCLot: 1080113)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.7	84	120	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.2	84	120	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.2	85	120	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.6	83	120	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.6	86	120	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.8	85	120	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.1	83	120	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	107	83	120	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	84	120	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	107	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1073446)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	90.8	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1073438)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1073447)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	94.6	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1075252)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.2	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075251)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1073437)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	87	115	
EP008: Chlorophyll (QCLot: 1080588)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	97.3	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1074742)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	83.2	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	83.2	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	83.8	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1075209)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	93.2	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074742)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	85.7	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	81.2	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	108	11	117	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1075209)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	96.1	74	115
EP080: BTEXN (QCLot: 1075209)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	93.0	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	113	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	101	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	101	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	103	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1078181)							
EP1709106-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	106	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	97.6	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	99.5	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	102	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	98.0	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	105	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	102	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	109	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1078185)							
EP1709130-007	FS2_230817	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	105	70	130
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	97.8	70	130
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	99.2	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	98.2	70	130
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	100	70	130
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	101	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	107	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1080112)							
EP1709048-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	97.8	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	96.2	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1080112) - continued							
EP1709048-002	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	91.7	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	89.4	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	93.6	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	96.9	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	89.8	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	97.4	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1080113)							
EP1709130-004	NLWS-N2_230817	EG020A-T: Arsenic	7440-38-2	1 mg/L	112	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	106	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	93.3	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	99.0	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	102	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	102	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	100	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	108	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1073446)							
EP1709124-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	93.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1073438)							
EP1709130-001	BLNS-B1_230817	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	104	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1073447)							
EP1709124-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1075252)							
EP1709124-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	86.8	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1075251)							
EP1709124-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	107	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1073437)							
EP1709130-001	BLNS-B1_230817	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1074742)							
EP1709130-001	BLNS-B1_230817	EP071: C10 - C14 Fraction	----	400 µg/L	53.1	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	86.9	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	82.6	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1075209)							
EP1709130-002	A2_230817	EP080: C6 - C9 Fraction	----	240 µg/L	95.6	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074742)							
EP1709130-001	BLNS-B1_230817	EP071: >C10 - C16 Fraction	----	400 µg/L	58.1	45	122

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 Work Order : EP1709130
 Client : AECOM Australia Pty Ltd
 Project : 60478410



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074742) - continued							
EP1709130-001	BLNS-B1_230817	EP071: >C16 - C34 Fraction	----	600 µg/L	89.3	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	82.9	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1075209)							
EP1709130-002	A2_230817	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	94.7	77	137
EP080: BTEXN (QCLot: 1075209)							
EP1709130-002	A2_230817	EP080: Benzene	71-43-2	20 µg/L	89.3	77	122
		EP080: Toluene	108-88-3	20 µg/L	102	74	126

QUALITY CONTROL REPORT

Work Order	: EP1709182	Page	: 1 of 7
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 24-Aug-2017
Order number	: 60475410-2.06	Date Analysis Commenced	: 24-Aug-2017
C-O-C number	: ----	Issue Date	: 30-Aug-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 13		
No. of samples analysed	: 13		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
ShukHui Li	Client Services - Technical Manager	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1080637)									
EP1709177-006	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0029	0.0028	4.67	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.054	0.048	11.7	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.374	0.374	0.00	0% - 50%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	57.5	55.9	2.75	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	3.74	3.71	0.564	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	3.74	3.78	0.942	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	18.7	18.5	1.05	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.20	<0.20	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	1.70	1.74	2.19	No Limit		
EP1709182-003	GW-D7_	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.005	0.004	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.034	0.032	5.52	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.020	0.021	5.35	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	1.57	1.60	1.90	0% - 20%		
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1073905)									
EP1709162-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.00	No Limit
EP1709182-003	GW-D7_	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.14	0.14	0.00	0% - 50%



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1073896)										
EP1709182-003	GW-D7_	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.05	0.05	0.00	No Limit	
EP1709162-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1073906)										
EP1709162-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.52	1.44	4.99	0% - 20%	
EP1709182-003	GW-D7_	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.66	4.76	2.22	0% - 20%	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1077712)										
EP1709140-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	3.0	0.00	No Limit	
EP1709182-008	T4B_	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.1	24.5	0% - 50%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1077713)										
EP1709173-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.58	0.58	0.00	No Limit	
EP1709140-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.78	1.77	0.733	0% - 20%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1077714)										
EP1709182-008	T4B_	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.29	0.27	6.75	0% - 20%	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1073895)										
EP1709182-003	GW-D7_	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.26	0.26	0.00	0% - 20%	
EP1709162-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1074751)										
EP1709182-003	GW-D7_	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1075227)										
EP1709168-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	160	160	0.00	No Limit	
EP1709182-004	GW-D8_	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1074751)										
EP1709182-003	GW-D7_	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1075227)										
EP1709168-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	160	170	0.00	No Limit	
EP1709182-004	GW-D8_	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1075227)										
EP1709168-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1080637)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.7	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	106	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	104	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	100	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.8	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	92.3	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	115	84	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1073905)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.1	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1073896)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1073906)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1077712)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.5	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077713)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.3	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077714)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.2	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1073895)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1074751)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	62.4	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	62.5	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	66.5	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1074752)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	75.6	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	94.5	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	91.8	34	105	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1075227)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	90.2	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074751)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	64.9	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	63.2	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	73.9	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074752)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	79.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	97.9	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	71.6	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1075227)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	91.5	74	115	
EP080: BTEXN (QCLot: 1075227)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	94.2	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	84.6	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	91.0	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	91.9	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	92.3	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	92.1	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1080637)								
EP1709178-001	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	105	70	130	
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	103	70	130	
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	96.9	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	97.1	70	130	
		EG020A-F: Lead	7439-92-1	0.2 mg/L	94.0	70	130	
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	96.2	70	130	
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.5	70	130	
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	104	70	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1073905)								
EP1709162-001	Anonymous							



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1073905) - continued							
EP1709162-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1073896)							
EP1709162-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	98.8	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1073906)							
EP1709162-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1077712)							
EP1709140-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.1	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077713)							
EP1709140-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	93.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1077714)							
EP1709182-009	BH10_	EK067G: Total Phosphorus as P	----	1 mg/L	95.2	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1073895)							
EP1709162-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1074751)							
EP1709182-003	GW-D7_	EP071: C10 - C14 Fraction	----	400 µg/L	55.9	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	70.1	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	65.4	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1075227)							
EP1709168-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	94.8	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1074751)							
EP1709182-003	GW-D7_	EP071: >C10 - C16 Fraction	----	400 µg/L	59.7	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	68.7	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	63.5	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1075227)							
EP1709168-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	97.2	77	137
EP080: BTEXN (QCLot: 1075227)							
EP1709168-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	88.6	77	122
		EP080: Toluene	108-88-3	20 µg/L	86.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1709224	Page	: 1 of 7
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Contact	: ShukHui Li
Address	: LEVEL 6 3 FORREST PLACE PERTH WA, AUSTRALIA 6849	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 25-Aug-2017
Order number	: 60478410-2.06	Date Analysis Commenced	: 25-Aug-2017
C-O-C number	: ----	Issue Date	: 31-Aug-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/1136/16 V2		
No. of samples received	: 3		
No. of samples analysed	: 3		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

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- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1082674)									
EP1709200-006	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.026	0.026	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.026	0.026	0.00	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EP1709229-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.082	0.083	0.00	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1082635)									
EP1709206-012	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1082635) - continued									
EP1709206-012	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1709206-024	Anonymous	EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.060	0.062	1.71	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.06	0.05	0.00	No Limit
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit		
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1076509)									
EP1709224-001	GW-D4_	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.03	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1076506)									
EP1709224-001	GW-D4_	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1709232-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1076510)									
EP1709230-009	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	6.51	6.53	0.176	0% - 20%
EP1709224-001	GW-D4_	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.22	2.20	1.04	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1080661)									
EP1709169-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.0	34.1	No Limit
EP1709226-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.2	5.1	3.07	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1080660)									
EP1709169-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.07	<0.05	34.7	No Limit
EP1709226-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.53	0.55	2.41	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1076507)									
EP1709224-001	GW-D4_	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1079252)									
EP1709196-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1709225-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	60	60	0.00	No Limit

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 Work Order : EP1709224
 Client : AECOM Australia Pty Ltd
 Project : 60478410



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1079252)										
EP1709196-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1709225-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	50	50	0.00	No Limit	
EP080: BTEXN (QC Lot: 1079252)										
EP1709196-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1709225-003	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			
	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1082674)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.5	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	110	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	107	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	102	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	102	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	106	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	105	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	109	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	105	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	115	84	120	
EG020T: Total Metals by ICP-MS (QCLot: 1082635)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.0	84	120	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.3	85	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.1	84	120	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	91.7	85	120	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.3	83	120	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.8	86	120	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	120	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.4	83	120	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	94.0	83	120	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.0	84	120	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1076509)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1076506)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1076510)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1080661)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.4	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1080660)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.2	70	130	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1076507)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1077728)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	77.1	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	95.0	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	99.0	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1079252)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	96.5	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1077728)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	81.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	98.9	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	99.4	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1079252)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	99.4	74	115	
EP080: BTEXN (QCLot: 1079252)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	91.2	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	110	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	98.0	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	98.9	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	97.4	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	100	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1082674)								
EP1709200-007	Anonymous	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	96.7	70	130	
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	99.8	70	130	
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	98.6	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	96.2	70	130	
		EG020A-F: Lead	7439-92-1	0.2 mg/L	94.2	70	130	
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	99.9	70	130	
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	99.7	70	130	
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	96.6	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1082635)							
EP1709206-013	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	99.9	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	99.2	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	89.6	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	93.6	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	97.9	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	99.3	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	98.7	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	101	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1076509)							
EP1709224-001	GW-D4_	EK055G: Ammonia as N	7664-41-7	1 mg/L	101	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1076506)							
EP1709217-069	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.2	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1076510)							
EP1709224-001	GW-D4_	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1080661)							
EP1709169-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	82.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1080660)							
EP1709169-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1076507)							
EP1709217-069	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	104	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1079252)							
EP1709196-009	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	88.0	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1079252)							
EP1709196-009	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	92.3	77	137
EP080: BTEXN (QCLot: 1079252)							
EP1709196-009	Anonymous	EP080: Benzene	71-43-2	20 µg/L	87.4	77	122
		EP080: Toluene	108-88-3	20 µg/L	101	74	126

QUALITY CONTROL REPORT

Work Order	: EP1710701	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 28-Sep-2017
Order number	: W81020-103	Date Analysis Commenced	: 28-Sep-2017
C-O-C number	: ----	Issue Date	: 04-Oct-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 11		
No. of samples analysed	: 11		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1146154)									
EP1710701-001	D1	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.022	12.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.09	0.09	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.28	0.27	0.00	No Limit		
EP1710701-010	WQA01_260917	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1146153)									
EP1710701-001	D1	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP1710701-010	WQA01_260917	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	0.2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1143350)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1143350) - continued									
EP1710674-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.21	0.22	0.00	0% - 20%
EP1710676-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1143354)									
EP1710701-010	WQA01_260917	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1710723-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1143337)									
EP1710701-009	GW-D7	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.00	No Limit
EP1710701-001	D1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1143351)									
EP1710674-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1710676-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	7.75	7.77	0.227	0% - 20%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1143355)									
EP1710701-010	WQA01_260917	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	17.5	17.6	0.284	0% - 20%
EP1710723-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.68	4.73	1.11	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1148829)									
EP1710701-001	D1	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EP1710711-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1148830)									
EP1710701-001	D1	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.00	No Limit
EP1710711-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1143338)									
EP1710701-009	GW-D7	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.19	0.19	0.00	0% - 50%
EP1710701-001	D1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1144064)									
EP1710704-002	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1149393)									
EP1710594-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1710701-008	GW-D4	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1144064)									
EP1710704-002	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1149393)									
EP1710594-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1710701-008	GW-D4	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1149393)									

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 Work Order : EP1710701
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1149393) - continued									
EP1710594-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1710701-008	GW-D4	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1146154)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.2	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.8	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.3	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.2	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	99.2	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.7	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.4	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	101	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	82	114	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1146153)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	95.8	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1143350)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	87	115	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1143354)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1143337)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1143351)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	92	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1143355)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1148829)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.2	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1148830)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	93.0	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1143338)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	103	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1144064)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	84.5	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	79.5	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	80.6	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1149393)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1149393) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	102	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1144064)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	85.8	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	78.0	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	89.9	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1149393)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	104	74	115
EP080: BTEXN (QCLot: 1149393)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	98.2	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	113	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	100	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	104	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	100	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)		
				Low	High			
EG020F: Dissolved Metals by ICP-MS (QCLot: 1146154)								
EP1710701-002	D2	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	101	70	130	
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	111	70	130	
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	111	70	130	
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	106	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	109	70	130	
		EG020A-F: Lead	7439-92-1	0.1 mg/L	102	70	130	
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	106	70	130	
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	111	70	130	
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	114	70	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1143350)								
EP1710674-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	81.9	70	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1143354)								
EP1710701-009	GW-D7	EK055G: Ammonia as N	7664-41-7	1 mg/L	101	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1143337)							
EP1710662-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	95.4	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1143351)							
EP1710674-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	84.7	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1143355)							
EP1710701-009	GW-D7	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1148829)							
EP1710701-002	D2	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	99.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1148830)							
EP1710701-002	D2	EK067G: Total Phosphorus as P	----	1 mg/L	96.6	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1143338)							
EP1710701-001	D1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	113	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1144064)							
EP1710704-002	Anonymous	EP071: C10 - C14 Fraction	----	385 µg/L	71.0	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	81.2	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	65.5	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1149393)							
EP1710594-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	81.4	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1144064)							
EP1710704-002	Anonymous	EP071: >C10 - C16 Fraction	----	380 µg/L	73.6	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	73.3	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	71.9	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1149393)							
EP1710594-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	81.2	77	137
EP080: BTEXN (QCLot: 1149393)							
EP1710594-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	81.0	77	122
		EP080: Toluene	108-88-3	20 µg/L	97.8	74	126

QUALITY CONTROL REPORT

Work Order	: EP1710595	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 26-Sep-2017
Order number	: W81020-103	Date Analysis Commenced	: 26-Sep-2017
C-O-C number	: ----	Issue Date	: 04-Oct-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 11		
No. of samples analysed	: 11		



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This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1143556)									
EB1720039-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.164	0.165	0.624	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.011	0.012	0.00	0% - 50%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.111	0.110	0.00	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	6.31	6.34	0.540	0% - 20%		
ET1701227-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.291	0.294	1.06	0% - 20%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.040	0.040	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.023	0.024	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.072	0.072	0.00	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1143705)									
EP1710595-005	A1E	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.384	0.383	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1143705) - continued									
EP1710595-005	A1E	EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.008	0.007	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.17	0.17	0.00	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	3.90	3.90	0.00	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1151760)									
EP1710595-001	GW-D3	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.5	0.5	0.00	No Limit
EP1710595-010	S1	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1151766)									
EP1710595-005	A1E	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	0.4	31.7	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1137689)									
EP1710595-002	GW-D5	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.06	18.2	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1137663)									
EP1710595-007	A1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1710568-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1137690)									
EP1710596-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	25.4	25.6	0.862	0% - 20%
EP1710595-002	GW-D5	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1142599)									
EP1710550-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EP1710550-007	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.1	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1142602)									
EP1710595-005	A1E	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.1	5.2	2.46	0% - 20%
EP1710601-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1142600)									
EP1710550-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.05	72.9	No Limit
EP1710550-007	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.05	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1142601)									
EP1710595-005	A1E	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.48	1.47	0.00	0% - 20%
EP1710601-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1137662)									
EP1710595-007	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.30	1.29	1.38	0% - 20%
EP1710568-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1138658)									
EP1710601-004	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1144023)									
EP1710504-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1710595-002	GW-D5	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

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Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1138658)									
EP1710601-004	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1144023)									
EP1710504-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1710595-002	GW-D5	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1144023)									
EP1710504-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1710595-002	GW-D5	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1143556)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.8	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.2	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.0	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.9	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	93.7	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.2	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.2	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	102	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	87.6	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	106	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1143705)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.4	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.6	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.6	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	106	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	92.1	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	105	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1151760)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	108	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1151766)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	115	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1137689)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.1	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1137663)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1137690)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1142599)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	88.8	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1142602)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	88.0	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1142600)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1142600) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	87.4	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1142601)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1137662)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	93.8	87	115	
EP008: Chlorophyll (QCLot: 1147596)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	99.4	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1138658)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	57.0	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	66.8	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	64.4	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1144023)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	109	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1138658)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	58.9	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	70.4	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	41.1	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1144023)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	111	74	115	
EP080: BTEXN (QCLot: 1144023)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	107	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	104	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	101	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	113	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1143556)								
EB1720039-002	Anonymous	EG020A-F: Aluminium	7429-90-5	2.5 mg/L	70.2	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1143556) - continued							
EB1720039-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.5 mg/L	79.8	70	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	80.3	70	130
		EG020A-F: Chromium	7440-47-3	0.5 mg/L	82.4	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	76.0	70	130
		EG020A-F: Lead	7439-92-1	0.5 mg/L	73.5	70	130
		EG020A-F: Manganese	7439-96-5	0.5 mg/L	74.4	70	130
		EG020A-F: Nickel	7440-02-0	0.5 mg/L	78.8	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	72.4	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1143705)							
EP1710595-006	A1N	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	103	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	110	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	120	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.1	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1137689)							
EP1710595-001	GW-D3	EK055G: Ammonia as N	7664-41-7	1 mg/L	102	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1137663)							
EP1710568-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1137690)							
EP1710595-001	GW-D3	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	104	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1142599)							
EP1710550-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	102	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1142602)							
EP1710595-006	A1N	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	91.1	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1142600)							
EP1710550-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	92.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1142601)							
EP1710595-006	A1N	EK067G: Total Phosphorus as P	----	1 mg/L	87.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1137662)							
EP1710568-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	108	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1138658)							
EP1710601-004	Anonymous	EP071: C10 - C14 Fraction	----	385 µg/L	91.8	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	125	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	108	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1144023)							



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
				<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1144023) - continued							
EP1710504-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	83.3	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1138658)							
EP1710601-004	Anonymous	EP071: >C10 - C16 Fraction	----	380 µg/L	102	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	118	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	125	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1144023)							
EP1710504-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	90.1	77	137
EP080: BTEXN (QCLot: 1144023)							
EP1710504-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	78.7	77	122
		EP080: Toluene	108-88-3	20 µg/L	81.0	74	126

QUALITY CONTROL REPORT

Work Order	: EP1710522	Page	: 1 of 6
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 22-Sep-2017
Order number	: W81020-103	Date Analysis Commenced	: 22-Sep-2017
C-O-C number	: ----	Issue Date	: 03-Oct-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 2		
No. of samples analysed	: 2		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1141013)									
EP1710453-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0005	<0.0005	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.160	0.178	10.5	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.025	<0.025	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.05	0.00	No Limit
EP1710521-005	Anonymous	EG020A-F: Iron	7439-89-6	0.05	mg/L	2.03	1.98	2.26	0% - 20%
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0005	<0.0005	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.542	0.551	1.65	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.025	<0.025	0.00	No Limit
EP1710127-003	Anonymous	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.05	<0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	14.4	14.6	1.75	0% - 20%
		EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1146136)							
EP1710127-003	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.0020 mg/L	<2.0	0.00	No Limit
EP1710669-004	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.4	0.2	47.5	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1131888)									

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 Work Order : EP1710522
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1131888) - continued										
EP1710492-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.81	1.83	1.48	0% - 20%	
EP1710510-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.05	38.5	No Limit	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1131779)										
EP1710517-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1710492-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.04	0.05	0.00	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1131889)										
EP1710492-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.07	0.00	No Limit	
EP1710510-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.18	0.18	0.00	0% - 50%	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1136787)										
EP1710454-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.3	0.00	No Limit	
EP1710495-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.8	0.00	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1136786)										
EP1710454-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00	No Limit	
EP1710495-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.20	107	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1131780)										
EP1710517-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	0.06	0.00	No Limit	
EP1710492-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1138449)										
EP1710473-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1710473-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1138449)										
EP1710473-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1710473-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1138449)										
EP1710473-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1710473-011	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1141013)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.7	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	89.4	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	105	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.7	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	105	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	90.1	82	114	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1146136)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	106	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1131888)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1131779)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	106	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1131889)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1136787)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	89.2	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1136786)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.8	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1131780)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1135737)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	50.0	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	55.8	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	56.2	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1138449)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	102	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1135737)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	52.0	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	56.6	35	108	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1135737) - continued									
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	52.8	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1138449)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	103	74	115	
EP080: BTEXN (QCLot: 1138449)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	107	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	102	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	104	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	99.8	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
				Low	High		
EG020F: Dissolved Metals by ICP-MS (QCLot: 1141013)							
EP1710453-002	Anonymous	EG020A-F: Aluminium	7429-90-5	2.5 mg/L	76.8	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	80.4	70	130
		EG020A-F: Cadmium	7440-43-9	0.5 mg/L	83.7	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	123	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	70.6	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	125	70	130
		EG020A-F: Manganese	7439-96-5	0.5 mg/L	80.2	70	130
		EG020A-F: Nickel	7440-02-0	0.5 mg/L	73.2	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	73.9	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1131888)							
EP1710492-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	98.6	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1131779)							
EP1710492-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1131889)							
EP1710492-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1136787)							

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 Work Order : EP1710522
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1136787) - continued							
EP1710454-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1136786)							
EP1710454-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1131780)							
EP1710492-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1138449)							
EP1710473-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	77.6	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1138449)							
EP1710473-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	77.6	77	137
EP080: BTEXN (QCLot: 1138449)							
EP1710473-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	79.8	77	122
		EP080: Toluene	108-88-3	20 µg/L	76.2	74	126

QUALITY CONTROL REPORT

Work Order	: EP1710339	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA - R8 Water Monitoring	Date Samples Received	: 19-Sep-2017
Order number	: W81020-103	Date Analysis Commenced	: 20-Sep-2017
C-O-C number	: ----	Issue Date	: 27-Sep-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 8		
No. of samples analysed	: 8		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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Daniel Fisher	Inorganics Analyst	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1132215)									
EP1710339-001	BLNS-B1	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.041	0.041	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.27	0.29	5.52	No Limit
ES1723718-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.005	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.020	0.021	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.037	0.042	13.4	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.04	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.21	0.22	5.71	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1132231)									
EP1710339-001	BLNS-B1	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.043	0.045	4.30	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1132231) - continued									
EP1710339-001	BLNS-B1	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.39	0.39	0.00	No Limit
ES1723656-008	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1130015)									
EP1710339-001	BLNS-B1	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1130026)									
EP1710339-001	BLNS-B1	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1126239)									
EP1710340-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.01	0.03	84.9	No Limit
EP1710339-001	BLNS-B1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.47	0.47	0.00	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1126235)									
EP1710349-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	232	233	0.642	0% - 20%
EP1710339-002	A2	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.08	0.08	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1126240)									
EP1710340-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.50	0.50	0.00	0% - 20%
EP1710339-001	BLNS-B1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.37	0.35	4.76	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1128509)									
EP1710326-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.00	No Limit
EP1710339-005	FS4A	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.9	4.4	10.4	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1128508)									
EP1710326-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.08	47.8	No Limit
EP1710339-005	FS4A	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.37	0.36	0.00	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1126236)									
EP1710339-002	A2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.22	0.22	0.00	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1127320)									
EP1710339-001	BLNS-B1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1135748)									
EP1710311-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1710317-006	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1127320)									
EP1710339-001	BLNS-B1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1135748)									
EP1710311-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1710317-006	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1135748)									
EP1710311-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit
EP1710317-006	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1132215)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	92.8	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.8	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.7	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.1	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.9	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.8	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.4	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.6	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	89.7	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.9	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1132231)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.6	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.2	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.6	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.9	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.9	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1130015)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	96.3	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1130026)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	95.0	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1126239)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1126235)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1126240)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	97.1	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1128509)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	93.2	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1128508)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.9	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1126236)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1126236) - continued								
EP071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	101	87	115
EP008: Chlorophyll (QCLot: 1130531)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	103	70	130
EP008: Chlorophyll (QCLot: 1130532)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	96.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1127320)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	61.8	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	65.1	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	59.0	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1135748)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	102	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1127320)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	64.2	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	61.2	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	68.3	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1135748)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	100	74	115
EP080: BTEXN (QCLot: 1135748)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	100	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	101	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	101	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	99.4	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	99.5	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1132215)							
EP1710339-002	A2	EG020A-F: Arsenic	7440-38-2	1 mg/L	120	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	120	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	118	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1132215) - continued							
EP1710339-002	A2	EG020A-F: Copper	7440-50-8	1 mg/L	121	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	116	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	115	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	121	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	120	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1132231)							
EP1710339-002	A2	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	96.8	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	96.5	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	96.0	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	97.0	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	99.7	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1126239)							
EP1710339-002	A2	EK055G: Ammonia as N	7664-41-7	1 mg/L	88.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1126235)							
EP1710339-001	BLNS-B1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1126240)							
EP1710339-002	A2	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	93.7	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1128509)							
EP1710326-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1128508)							
EP1710326-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	103	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1126236)							
EP1710339-001	BLNS-B1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1127320)							
EP1710339-001	BLNS-B1	EP071: C10 - C14 Fraction	----	385 µg/L	59.2	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	61.6	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	59.1	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1135748)							
EP1710311-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	84.8	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1127320)							
EP1710339-001	BLNS-B1	EP071: >C10 - C16 Fraction	----	380 µg/L	60.9	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	59.1	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	72.4	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1135748)							
EP1710311-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	84.6	77	137

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 Work Order : EP1710339
 Client : MRIA
 Project : MRIA - R8 Water Monitoring



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080: BTEXN (QCLot: 1135748)							
EP1710311-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	85.1	77	122
		EP080: Toluene	108-88-3	20 µg/L	83.4	74	126

QUALITY CONTROL REPORT

Work Order	: EP17111669	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 19-Oct-2017
Order number	: W81020-103	Date Analysis Commenced	: 19-Oct-2017
C-O-C number	: ----	Issue Date	: 26-Oct-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 13		
No. of samples analysed	: 13		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1197172)									
EP1711669-001	A2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.012	0.011	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.23	0.23	0.00	No Limit		
EP1711669-010	BH10	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	1.15	1.14	1.05	0% - 20%
EG020A-F: Iron	7439-89-6	0.05	mg/L	3.70	3.68	0.456	0% - 20%		
EG020T: Total Metals by ICP-MS (QC Lot: 1197178)									
EB1722086-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0011	0.0011	0.00	0% - 50%
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	2.16	2.13	1.41	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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 Work Order : EP1711669
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1197178) - continued									
EB1722086-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.14	0.15	9.66	0% - 50%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.47	0.46	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1198510)									
EP1711669-001	A2	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP1711669-010	BH10	EG094B-F: Selenium	7782-49-2	0.2	µg/L	1.0	1.1	13.4	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1198512)									
EP1711669-001	A2	EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1187050)									
EP1711664-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	5.46	5.66	3.61	0% - 20%
EP1711669-009	T3B	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.09	0.06	48.4	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1187039)									
EP1711669-005	T4C	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1711633-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1187051)									
EP1711664-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.31	0.29	8.20	0% - 20%
EP1711669-009	T3B	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1188686)									
EP1711653-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EP1711573-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1188688)									
EP1711669-012	GW-D7	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.0	4.8	4.97	No Limit
EP1711669-009	T3B	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1188687)									
EP1711649-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.00	No Limit
EP1711573-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1188689)									
EP1711669-009	T3B	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1187040)									
EP1711669-005	T4C	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1711633-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1188023)									
EP1711669-012	GW-D7	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1188807)									
EP1711643-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1711669-004	WQA02_171017	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

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 Work Order : EP1711669
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1188023)									
EP1711669-012	GW-D7	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1188807)									
EP1711643-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1711669-004	WQA02_171017	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1188807)									
EP1711643-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit
EP1711669-004	WQA02_171017	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1197172)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	89.6	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.0	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.1	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	96.2	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.8	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.9	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.6	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	93.8	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.9	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1197178)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	95.8	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.5	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	98.9	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	100	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1198510)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	104	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1198512)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	107	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1187050)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1187039)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1187051)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1188686)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.2	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1188688)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.4	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1188687)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1188687) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.6	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1188689)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1187040)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	107	87	115	
EP008: Chlorophyll (QCLot: 1194827)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	119	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1188023)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	39.1	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	50.8	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	46.4	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1188807)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	108	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1188023)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	42.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	49.2	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	51.6	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1188807)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	104	74	115	
EP080: BTEXN (QCLot: 1188807)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	105	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	95.8	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	103	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	110	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	105	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	103	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1197172)								
EP1711669-002	A2S	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	91.0	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1197172) - continued							
EP1711669-002	A2S	EG020A-F: Arsenic	7440-38-2	0.1 mg/L	98.8	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	99.5	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	97.1	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	96.8	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	96.9	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	94.7	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	94.2	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	95.1	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1197178)							
EB1722086-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	130	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	122	70	130
		EG020A-T: Manganese	7439-96-5	25 mg/L	90.2	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	105	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	124	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1187050)							
EP1711663-005	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	106	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1187039)							
EP1711633-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	110	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1187051)							
EP1711663-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	86.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1188686)							
EP1711573-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.3	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1188688)							
EP1711669-011	GW-D3	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	86.7	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1188687)							
EP1711573-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	98.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1188689)							
EP1711669-011	GW-D3	EK067G: Total Phosphorus as P	----	1 mg/L	92.2	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1187040)							
EP1711633-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	114	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1188023)							
EP1711669-012	GW-D7	EP071: C10 - C14 Fraction	----	385 µg/L	77.3	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	92.5	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	68.0	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1188807)							

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 Work Order : EP1711669
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1188807) - continued							
EP1711643-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	113	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1188023)							
EP1711669-012	GW-D7	EP071: >C10 - C16 Fraction	----	380 µg/L	80.5	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	82.6	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	61.2	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1188807)							
EP1711643-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	106	77	137
EP080: BTEXN (QCLot: 1188807)							
EP1711643-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	103	77	122
		EP080: Toluene	108-88-3	20 µg/L	92.4	74	126

QUALITY CONTROL REPORT

Work Order	: EP1711878	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 24-Oct-2017
Order number	: W81020-103	Date Analysis Commenced	: 24-Oct-2017
C-O-C number	: ----	Issue Date	: 31-Oct-2017
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 15		
No. of samples analysed	: 15		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1203291)									
EB1722116-010	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	<0.01	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EB1722116-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.025	0.024	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.012	0.011	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.00	No Limit		
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1203295)									
EP1711878-004	NLWS-N2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1203295) - continued									
EP1711878-004	NLWS-N2	EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.267	0.262	1.72	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.07	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	3.91	3.83	2.22	0% - 20%
EP1711878-013	T3C	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	4.18	4.20	0.332	0% - 20%		
EG020T: Total Metals by ICP-MS (QC Lot: 1203342)									
EB1722346-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.388	0.386	0.357	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.37	0.35	5.20	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	1.66	1.75	5.47	0% - 20%
ET1701410-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	3.26	3.26	0.267	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.006	0.005	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.022	0.022	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	7.36	7.28	1.13	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	8.24	8.23	0.00	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1207784)									
EP1711878-001	A1	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.3	<0.2	0.00	No Limit
EP1711878-010	A3	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1207523)									
EP1711878-002	A1N	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	0.2	0.00	No Limit
EP1711878-009	S1	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	<0.2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1196918)									
EP1711800-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.04	58.5	No Limit

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 Work Order : EP1711878
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1196918) - continued										
EP1711878-007	RD1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.07	0.00	No Limit	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1196899)										
EP1711878-002	A1N	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1711878-011	GW-D4	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.01	0.00	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1196919)										
EP1711800-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.03	0.00	No Limit	
EP1711878-007	RD1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	0.00	No Limit	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1207510)										
EP1711869-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	29.6	29.6	0.00	0% - 20%	
EP1711878-003	A1E	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.9	5.7	2.63	0% - 20%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1207509)										
EP1711869-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.31	0.30	4.14	No Limit	
EP1711878-003	A1E	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.56	1.57	0.00	0% - 20%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1207511)										
EP1711879-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	<0.05	26.8	No Limit	
EP1711881-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.76	0.76	0.00	0% - 20%	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1196898)										
EP1711878-002	A1N	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.06	1.05	0.00	0% - 20%	
EP1711878-011	GW-D4	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1204835)										
EP1711878-001	A1	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1711878-011	GW-D4	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1204835)										
EP1711878-001	A1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1711878-011	GW-D4	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1204835)										
EP1711878-001	A1	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1711878-011	GW-D4	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit		

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 Work Order : EP1711878
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EP080: BTEXN (QC Lot: 1204835) - continued									
EP1711878-011	GW-D4	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1203291)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.8	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.7	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	107	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	101	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	101	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	82	114	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1203295)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	103	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.6	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.1	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	108	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	100	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	103	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	102	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1203342)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.4	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	91.2	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	93.5	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.9	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	85.2	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	101	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1207784)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	96.7	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1207523)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	113	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1196918)									



Sub-Matrix: WATER

				Method Blank (MB) Report	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
Method: Compound	CAS Number	LOR	Unit	Result		LCS	Low	High
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1196918) - continued								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	99.5	87	115
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1196899)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	86	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1196919)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	92	112
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1207510)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.9	82	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1207509)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	88.7	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1207511)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	88.9	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1196898)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	97.9	87	115
EP008: Chlorophyll (QCLot: 1207636)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	110	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1197953)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	73.9	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	75.3	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	59.5	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1204835)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	86.4	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1197953)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	75.8	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	70.0	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	31.6	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1204835)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	90.1	74	115
EP080: BTEXN (QCLot: 1204835)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	85.6	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	98.2	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.9	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	104	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	104	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	116	77	118



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
						Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1203291)							
EB1722116-002	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	99.1	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.3	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	97.1	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	97.4	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	102	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	97.6	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	96.5	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	96.3	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1203295)							
EP1711878-005	FS2	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	99.6	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	100	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	97.4	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	97.8	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	103	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	98.4	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	97.1	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	96.5	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	103	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1203342)							
EP1711878-001	A1	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	104	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.2	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	106	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	101	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	93.0	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1196918)							
EP1711800-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	120	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1196899)							
EP1711878-001	A1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	106	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1196919)							
EP1711800-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	94.4	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1207510)							
EP1711869-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	94.2	70	130

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 Work Order : EP1711878
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1207509)							
EP1711869-001	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	98.1	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1207511)							
EP1711879-003	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	105	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1196898)							
EP1711878-001	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	104	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1204835)							
EP1711878-002	A1N	EP080: C6 - C9 Fraction	----	240 µg/L	90.2	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1204835)							
EP1711878-002	A1N	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	92.5	77	137
EP080: BTEXN (QCLot: 1204835)							
EP1711878-002	A1N	EP080: Benzene	71-43-2	20 µg/L	85.5	77	122
		EP080: Toluene	108-88-3	20 µg/L	91.9	74	126

QUALITY CONTROL REPORT

Work Order	: EP1712054	Page	: 1 of 6
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 27-Oct-2017
Order number	: W81020-103	Date Analysis Commenced	: 27-Oct-2017
C-O-C number	: ----	Issue Date	: 06-Nov-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 2		
No. of samples analysed	: 2		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1212916)									
EP1712054-001	BH12	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.026	0.026	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1216998)									
EP1712054-001	BH12	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.5	0.4	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1205467)									
EP1712029-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.06	0.00	No Limit
EP1712030-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1206037)									
EP1712067-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.04	0.00	No Limit
EP1712053-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1205468)									
EP1712029-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	8.41	8.28	1.54	0% - 20%
EP1712030-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.50	0.52	2.50	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1217693)									
EP1712014-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	15.0	14.4	4.39	0% - 20%
EP1712063-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.4	4.4	19.2	0% - 20%

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 Work Order : EP1712054
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1217692)										
EP1712014-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.11	0.15	32.7	No Limit	
EP1712063-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.15	122	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1206041)										
EP1712054-001	BH12	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1712067-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1216595)										
EP1712000-049	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1712060-023	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1216595)										
EP1712000-049	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1712060-023	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1216595)										
EP1712000-049	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1712060-023	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1212916)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.5	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.1	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.0	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.6	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	103	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.0	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100.0	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	102	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.1	82	114	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1216998)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	106	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1205467)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.5	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1206037)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	88.2	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1205468)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.4	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1217693)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.3	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1217692)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.6	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1206041)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1207626)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	37.1	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	43.5	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	40.1	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1216595)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	108	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1207626)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	38.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	40.1	35	108	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1207626) - continued									
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	25.0	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1216595)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	111	74	115	
EP080: BTEXN (QCLot: 1216595)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	92.4	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	102	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.2	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	103	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	99.0	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	77.0	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1212916)								
EP1712054-002	GW-D8	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	94.7	70	130	
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.0	70	130	
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	89.0	70	130	
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	94.9	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	102	70	130	
		EG020A-F: Lead	7439-92-1	0.1 mg/L	95.0	70	130	
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	95.8	70	130	
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	97.4	70	130	
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	100.0	70	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1205467)								
EP1712029-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	106	70	130	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1206037)								
EP1712035-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	94.8	70	130	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1205468)								
EP1712029-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1217693)								

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 Work Order : EP1712054
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1217693) - continued							
EP1712014-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	91.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1217692)							
EP1712014-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	100	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1206041)							
EP1712054-001	BH12	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1216595)							
EP1712001-027	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	109	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1216595)							
EP1712001-027	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	109	77	137
EP080: BTEXN (QCLot: 1216595)							
EP1712001-027	Anonymous	EP080: Benzene	71-43-2	20 µg/L	96.4	77	122
		EP080: Toluene	108-88-3	20 µg/L	100	74	126

QUALITY CONTROL REPORT

Work Order	: EP1712990	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 17-Nov-2017
Order number	: W81020-103	Date Analysis Commenced	: 17-Nov-2017
C-O-C number	: ----	Issue Date	: 27-Nov-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 14		
No. of samples analysed	: 14		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
David Viner	SENIOR LAB TECH	Perth Organics, Malaga, WA
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1259849)									
EP1712990-003	T2F	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.049	0.050	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	2.09	2.07	0.694	0% - 20%		
EB1724360-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.093	0.093	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.20	0.20	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1259895)									
EP1712990-010	WQA02_151117	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.041	0.041	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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 Work Order : EP1712990
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1259895) - continued									
EP1712990-010	WQA02_151117	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.27	0.28	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1268118)									
EP1712990-001	D1	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.7	0.6	0.00	No Limit
EP1712990-010	WQA02_151117	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.2	<0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1268170)									
EP1712990-010	WQA02_151117	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1253009)									
EP1712990-001	D1	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1712990-010	WQA02_151117	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1253002)									
EP1712990-001	D1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.06	0.07	0.00	No Limit
EP1712990-011	BLNS-B1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1253008)									
EP1712990-001	D1	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.98	2.04	2.64	0% - 20%
EP1712990-010	WQA02_151117	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1255201)									
EP1712868-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.6	3.5	2.96	No Limit
EP1712964-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	89.9	85.4	5.15	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1255203)									
EP1712990-003	T2F	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	0.8	18.5	0% - 50%
EP1712990-013	A2S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.9	1.9	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1255200)									
EP1712868-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.74	0.62	16.5	0% - 50%
EP1712964-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	16.6	15.9	4.47	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1255202)									
EP1712990-003	T2F	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.04	0.00	No Limit
EP1712990-013	A2S	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.36	0.35	3.47	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1253001)									
EP1712990-001	D1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1712990-011	BLNS-B1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.23	0.23	0.00	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1254611)									
EP1712868-003	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	120	210	52.4	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	100	180	60.2	No Limit
EP1712990-011	BLNS-B1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit

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 Work Order : EP1712990
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1254611) - continued									
EP1712990-011	BLNS-B1	EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1257772)									
EP1712935-010	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1712990-007	GW-D5	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1254611)									
EP1712868-003	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	200	360	57.0	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP1712990-011	BLNS-B1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1257772)									
EP1712935-010	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1712990-007	GW-D5	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1257772)									
EP1712935-010	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1712990-007	GW-D5	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1259849)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.0	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.0	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.9	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	103	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.0	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	103	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	98.6	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.7	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1259895)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	104	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	102	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	108	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	109	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	109	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	103	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1268118)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	102	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1268170)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	104	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1253009)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1253002)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	97.0	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1253008)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1255201)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.2	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1255203)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.4	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1255200)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1255200) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	86.7	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1255202)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.4	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1253001)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	87	115	
EP008: Chlorophyll (QCLot: 1258027)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	113	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1254611)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	82.6	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	90.0	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	71.0	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1257772)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	105	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1254611)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	84.8	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	80.6	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	73.7	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1257772)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	108	74	115	
EP080: BTEXN (QCLot: 1257772)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	105	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	101	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	98.5	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	103	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	110	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1259849)								
EB1724360-004	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	108	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1259849) - continued							
EB1724360-004	Anonymous	EG020A-F: Arsenic	7440-38-2	0.1 mg/L	103	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	108	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	103	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	110	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	99.0	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	110	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	109	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	107	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1259895)							
EP1712990-011	BLNS-B1	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	105	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	107	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	108	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	107	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	106	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1253009)							
EP1712990-001	D1	EK055G: Ammonia as N	7664-41-7	1 mg/L	107	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1253002)							
EP1712990-001	D1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	111	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1253008)							
EP1712990-001	D1	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	87.0	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1255201)							
EP1712868-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	92.5	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1255203)							
EP1712990-005	GW-D3	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1255200)							
EP1712868-001	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	89.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1255202)							
EP1712990-005	GW-D3	EK067G: Total Phosphorus as P	----	1 mg/L	95.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1253001)							
EP1712990-001	D1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1254611)							
EP1712990-011	BLNS-B1	EP071: C10 - C14 Fraction	----	385 µg/L	66.4	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	70.5	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	60.1	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1257772)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1257772) - continued							
EP1712935-011	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	119	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1254611)							
EP1712990-011	BLNS-B1	EP071: >C10 - C16 Fraction	----	380 µg/L	69.9	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	64.7	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	64.2	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1257772)							
EP1712935-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	133	77	137
EP080: BTEXN (QCLot: 1257772)							
EP1712935-011	Anonymous	EP080: Benzene	71-43-2	20 µg/L	106	77	122
		EP080: Toluene	108-88-3	20 µg/L	100.0	74	126

QUALITY CONTROL REPORT

Work Order	: EP1712847	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 15-Nov-2017
Order number	: W81020-103	Date Analysis Commenced	: 15-Nov-2017
C-O-C number	: ----	Issue Date	: 22-Nov-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1250660)									
EP1712847-006	FS4A	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.033	0.034	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.16	0.16	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.94	0.94	0.00	0% - 50%
EB1724036-002	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.064	0.063	1.82	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.009	0.009	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.40	0.40	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1250666)									
EP1712825-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.020	0.020	0.00	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1250666) - continued									
EP1712825-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.006	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.09	0.10	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.84	0.85	1.43	0% - 50%
EP1712847-009	A3	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.052	0.052	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.009	0.008	13.7	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.27	0.27	0.00	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	2.77	2.76	0.00	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1260541)									
EP1712825-001	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.00	No Limit
EP1712847-009	A3	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1260540)									
EP1712825-001	Anonymous	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	0.2	0.00	No Limit
EP1712847-009	A3	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.3	0.3	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1246398)									
EP1712825-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.03	48.4	No Limit
EP1712847-002	A1N	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.38	0.35	7.93	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1246391)									
EP1712847-001	A1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1712847-007	RD1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1246399)									
EP1712825-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.02	57.6	No Limit
EP1712847-002	A1N	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1251278)									
EP1712815-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EP1712830-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	151	143	5.12	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1251280)									
EP1712847-009	A3	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.7	1.8	5.78	0% - 50%
EP1712867-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	9.9	10.4	4.82	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1251277)									
EP1712815-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	<0.01	0.00	No Limit
EP1712830-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	12.0	11.4	5.18	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1251279)									
EP1712847-009	A3	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	0.00	No Limit
EP1712867-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.24	0.26	9.60	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1246390)									

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 Work Order : EP1712847
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1246390) - continued									
EP1712847-007	RD1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.16	0.16	0.00	0% - 50%
EP1712824-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1251352)									
EP1712816-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1712890-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1251352)									
EP1712816-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1712890-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1251352)									
EP1712816-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1712890-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1250660)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	103	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.6	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.3	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.8	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	104	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.3	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	99.5	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1250666)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	107	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.9	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	104	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	105	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	101	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	114	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1260541)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	108	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1260540)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	114	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1246398)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	111	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1246391)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1246399)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1251278)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	88.7	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1251280)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.2	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1251277)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1251277) - continued								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1251279)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.1	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1246390)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	87	115
EP008: Chlorophyll (QCLot: 1248851)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	105	70	130
EP008: Chlorophyll (QCLot: 1248852)								
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	106	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1247903)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	87.8	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	93.7	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	77.6	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1251352)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	78.3	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1247903)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	92.4	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	84.1	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	84.5	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1251352)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	85.7	74	115
EP080: BTEXN (QCLot: 1251352)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	95.6	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	89.6	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	93.2	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	96.5	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	96.7	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	101	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report		
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)
				Concentration	MS	Low High



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1250660)							
EB1724036-001	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	107	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	110	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	101	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	98.5	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	101	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	102	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	97.0	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	96.0	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	107	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1250666)							
EP1712847-001	A1	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	104	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	98.7	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	99.8	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	105	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1246398)							
EP1712825-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	80.0	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1246391)							
EP1712847-001	A1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1246399)							
EP1712825-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1251278)							
EP1712815-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	109	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1251280)							
EP1712848-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	# Not Determined	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1251277)							
EP1712815-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	102	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1251279)							
EP1712848-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	102	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1246390)							
EP1712825-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	104	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1251352)							
EP1712847-001	A1	EP080: C6 - C9 Fraction	----	240 µg/L	91.1	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1251352)							

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 Work Order : EP1712847
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
				<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1251352) - continued							
EP1712847-001	A1	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	96.6	77	137
EP080: BTEXN (QCLot: 1251352)							
EP1712847-001	A1	EP080: Benzene	71-43-2	20 µg/L	102	77	122
		EP080: Toluene	108-88-3	20 µg/L	88.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1714429	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 20-Dec-2017
Order number	: W81020-103	Date Analysis Commenced	: 20-Dec-2017
C-O-C number	: ----	Issue Date	: 29-Dec-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 16		
No. of samples analysed	: 16		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1336878)									
EP1714429-001	GW-T3E-A	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.007	0.007	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.31	0.30	0.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.34	0.33	3.17	No Limit
ES1732146-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	6.10	6.19	1.40	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.027	0.031	12.7	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.026	4.84	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1337146)									
EP1714429-001	GW-T3E-A	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EP1714429-011	D2	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1332839)									

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 Work Order : EP1714429
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1332839) - continued									
EP1714429-002	GW-D5	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EP1714429-005	BH10	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.18	0.19	6.71	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1332606)									
EP1714430-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1714390-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1332934)									
EP1714429-012	GW-D4	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1714429-004	T3C	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1332838)									
EP1714429-002	GW-D5	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.04	0.00	No Limit
EP1714429-005	BH10	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.02	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1342262)									
EP1714300-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	<0.1	0.00	No Limit
EP1714416-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1342264)									
EP1714429-004	T3C	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.1	0.00	No Limit
EP1714429-015	GW-D3	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.3	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1342261)									
EP1714300-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.09	0.00	No Limit
EP1714416-004	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.05	46.1	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1342263)									
EP1714429-004	T3C	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1714429-015	GW-D3	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.04	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1332607)									
EP1714430-003	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1714390-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	0.06	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1332935)									
EP1714429-012	GW-D4	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1714429-004	T3C	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1334064)									
EP1714429-001	GW-T3E-A	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1714429-011	D2	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1334064)									
EP1714429-001	GW-T3E-A	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1714429-011	D2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1334064)									
EP1714429-001	GW-T3E-A	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1336878)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.5	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	97.1	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	88.9	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.0	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.2	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.8	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.9	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.8	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	91.3	82	112	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1337146)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	99.8	74	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1332839)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1332606)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1332934)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1332838)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1342262)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	91.0	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1342264)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.5	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1342261)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	99.4	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1342263)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	97.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1332607)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	107	87	115	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1332935)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	87	115	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1332641)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	78.3	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	77.8	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	71.1	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1334064)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	85.7	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1332641)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	81.6	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	74.5	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	45.6	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1334064)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	91.2	74	115
EP080: BTEXN (QCLot: 1334064)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	84.4	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	93.4	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	101	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	96.4	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1336878)							
EP1714429-002	GW-D5	EG020A-F: Arsenic	7440-38-2	1 mg/L	106	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	102	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	98.6	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	103	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	102	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	98.4	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	103	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	104	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1332839)							
EP1714429-001	GW-T3E-A	EK055G: Ammonia as N	7664-41-7	1 mg/L	100	70	130

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 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1332606)							
EP1714390-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	105	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1332934)							
EP1714389-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1332838)							
EP1714429-001	GW-T3E-A	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	110	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1342262)							
EP1714300-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	94.1	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1342264)							
EP1714429-005	BH10	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	95.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1342261)							
EP1714300-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	100	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1342263)							
EP1714429-005	BH10	EK067G: Total Phosphorus as P	----	1 mg/L	99.1	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1332607)							
EP1714390-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	114	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1332935)							
EP1714429-004	T3C	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	111	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1334064)							
EP1714429-002	GW-D5	EP080: C6 - C9 Fraction	----	240 µg/L	96.4	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1334064)							
EP1714429-002	GW-D5	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	102	77	137
EP080: BTEXN (QCLot: 1334064)							
EP1714429-002	GW-D5	EP080: Benzene	71-43-2	20 µg/L	91.3	77	122
		EP080: Toluene	108-88-3	20 µg/L	95.2	74	126

QUALITY CONTROL REPORT

Work Order	: EP1714152	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 14-Dec-2017
Order number	: W81020-103	Date Analysis Commenced	: 14-Dec-2017
C-O-C number	: ----	Issue Date	: 22-Dec-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Andrew Epps	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Malaga, WA
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
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Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1323090)									
EP1714152-001	A1	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.005	0.004	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.005	<0.001	130	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.239	0.240	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	<0.001	85.6	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.04	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.76	2.74	0.624	0% - 20%
EG020T: Total Metals by ICP-MS (QC Lot: 1322861)									
EP1714152-001	A1	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.255	0.260	1.80	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.011	0.010	10.0	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	3.73	3.88	4.02	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1330093)									
EP1714152-009	WQA02_131217	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EB1726447-006	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1332208)									
EP1714152-001	A1	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.5	0.5	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1317812)									

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 Work Order : EP1714152
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1317812) - continued									
EP1714152-002	A1N	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.08	0.06	25.5	No Limit
EP1714152-003	A1E	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.06	32.1	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1317882)									
EP1714146-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1714152-001	A1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1317813)									
EP1714152-002	A1N	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.02	<0.02	0.00	No Limit
EP1714152-003	A1E	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.02	<0.02	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1325078)									
EP1714107-013	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.2	0.00	0% - 50%
EP1714152-001	A1	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.3	4.2	0.00	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1325080)									
EP1714185-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.9	1.8	0.00	0% - 50%
EP1714204-005	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.3	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1325079)									
EP1714107-013	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.78	0.75	4.52	0% - 20%
EP1714152-001	A1	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.89	0.80	10.7	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1317883)									
EP1714152-001	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.47	0.47	0.00	0% - 20%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1319389)									
EP1714152-007	BLNS-B1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1323745)									
EP1714127-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1714152-003	A1E	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1319389)									
EP1714152-007	BLNS-B1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1323745)									
EP1714127-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1714152-003	A1E	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1323745)									
EP1714127-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

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 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1323745) - continued									
EP1714127-001	Anonymous	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP1714152-003	A1E	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1323090)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.1	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.8	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.8	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	100	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	100	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.4	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.1	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	92.9	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.0	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1322861)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.5	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.6	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	103	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1330093)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	91.2	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1332208)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	104	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1317812)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	102	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1317882)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.1	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1317813)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1325078)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.7	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1325080)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.3	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1325079)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1325079) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.8	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1317883)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	110	87	115	
EP008: Chlorophyll (QCLot: 1326803)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	89.1	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1319389)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	92.1	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	105	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	87.3	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1323745)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	92.8	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1319389)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	99.0	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	94.8	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	101	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1323745)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	96.8	74	115	
EP080: BTEXN (QCLot: 1323745)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	89.2	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	97.5	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	102	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	109	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	108	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	89.3	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1323090)								
EP1714152-002	A1N	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	109	70	130	
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.5	70	130	
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	100	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1323090) - continued							
EP1714152-002	A1N	EG020A-F: Chromium	7440-47-3	0.1 mg/L	97.4	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	94.8	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	95.6	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	99.3	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	92.2	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	91.2	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1322861)							
EP1714152-002	A1N	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	102	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	103	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	102	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	105	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1317812)							
EP1714152-001	A1	EK055G: Ammonia as N	7664-41-7	1 mg/L	87.4	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1317882)							
EP1714146-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	100	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1317813)							
EP1714152-001	A1	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	80.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1325078)							
EP1714107-014	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	84.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1325080)							
EP1714185-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	80.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1325079)							
EP1714107-014	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	110	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1317883)							
EP1714152-001	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	85.9	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1319389)							
EP1714152-007	BLNS-B1	EP071: C10 - C14 Fraction	----	385 µg/L	67.0	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	73.3	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	64.5	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1323745)							
EP1714127-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	122	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1319389)							
EP1714152-007	BLNS-B1	EP071: >C10 - C16 Fraction	----	380 µg/L	71.1	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	67.5	55	143

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 Work Order : EP1714152
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1319389) - continued							
EP1714152-007	BLNS-B1	EP071: >C34 - C40 Fraction	----	168 µg/L	78.0	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1323745)							
EP1714127-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	122	77	137
EP080: BTEXN (QCLot: 1323745)							
EP1714127-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	104	77	122
		EP080: Toluene	108-88-3	20 µg/L	106	74	126

QUALITY CONTROL REPORT

Work Order	: EP1801308	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 16-Jan-2018
Order number	: W81020-103	Date Analysis Commenced	: 17-Jan-2018
C-O-C number	: ----	Issue Date	: 25-Jan-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 6		
No. of samples analysed	: 6		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1384769)									
EP1801306-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.008	0.009	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.12	0.12	0.00	No Limit		
EP1801308-005	GW-D8	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.28	0.28	0.00	0% - 20%
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.19	0.18	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1381637)									
EP1801306-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.010	0.011	0.00	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1381637) - continued									
EP1801306-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.015	0.015	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.07	0.09	18.7	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.18	0.18	0.00	No Limit
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1388021)									
EP1801306-001	Anonymous	EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	<0.2	0.00	No Limit
EP1801308-005	GW-D8	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.7	0.6	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1388030)									
EM1801446-007	Anonymous	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.4	0.4	0.00	No Limit
EP1801308-001	A1	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.6	0.6	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1378731)									
EP1801292-007	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1801306-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.03	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1376988)									
EP1801303-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.01	0.00	No Limit
EP1801308-002	A1N	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1378732)									
EP1801294-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1801306-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.02	0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1378913)									
EP1801306-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.0	2.2	11.2	0% - 20%
EP1801312-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.5	3.8	8.85	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1378914)									
EP1801306-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.20	0.20	0.00	0% - 20%
EP1801312-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	4.86	4.76	2.05	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1376989)									
EP1801303-008	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP1801308-002	A1N	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1378484)									
EM1801574-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	30	40	0.00	No Limit
EP1801306-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1378484)									
EM1801574-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	40	50	0.00	No Limit
EP1801306-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1378484)									
EM1801574-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	2	2	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	10	11	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit

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 Work Order : EP1801308
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1378484) - continued									
EM1801574-001	Anonymous	EP080: meta- & para-Xylene	108-38-3	2	µg/L	4	5	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	3	3	0.00	No Limit
EP1801306-002	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1384769)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.9	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.1	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.5	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	98.6	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.6	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.7	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	95.9	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	114	
EG020T: Total Metals by ICP-MS (QCLot: 1381637)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.8	80	114	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.4	88	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.8	89	115	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	95.9	88	114	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	97.0	88	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	93.4	84	114	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	82	118	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1388021)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	103	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1388030)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	98.5	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1378731)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	95.0	80	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1376988)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	94	107	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1378732)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	112	89	114	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1378913)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	92.4	70	117	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1378914)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	93.9	70	120	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1376989)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1376989) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	94	108	
EP008: Chlorophyll (QCLot: 1378805)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	102	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1377128)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	97.7	58	134	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	100	60	133	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	96.0	54	137	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1378484)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	79.6	68	125	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1377128)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	95.4	58	122	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	97.4	56	132	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	100	58	137	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1378484)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	78.8	66	123	
EP080: BTEXN (QCLot: 1378484)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	82.9	74	123	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	81.0	77	128	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	84.1	73	126	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	87.2	72	131	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	87.7	74	131	
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	82.0	74	124	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1384769)								
EP1801306-002	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	92.4	70	130	
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	96.4	70	130	
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	94.6	70	130	
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	92.6	70	130	
		EG020A-F: Copper	7440-50-8	0.2 mg/L	95.2	70	130	
		EG020A-F: Lead	7439-92-1	0.1 mg/L	95.6	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1384769) - continued							
EP1801306-002	Anonymous	EG020A-F: Manganese	7439-96-5	0.1 mg/L	93.0	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	91.4	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	96.5	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1381637)							
EP1801306-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.5 mg/L	98.1	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.9	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	103	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	100	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	98.7	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1378731)							
EP1801292-008	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	82.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1376988)							
EP1801303-005	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	80.9	80	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1378732)							
EP1801294-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	91.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1378913)							
EP1801306-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	# 65.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1378914)							
EP1801306-004	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	92.9	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1376989)							
EP1801303-009	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	102	79	123
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1378484)							
EM1801577-001	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	65.1	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1378484)							
EM1801577-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	65.3	44	122
EP080: BTEXN (QCLot: 1378484)							
EM1801577-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	82.6	68	130
		EP080: Toluene	108-88-3	20 µg/L	77.5	72	132

QUALITY CONTROL REPORT

Work Order	: EM1801446	Page	: 1 of 11
Client	: MRIA	Laboratory	: Environmental Division Melbourne
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: 08 9209 7655
Project	: Roe 8 Rehab	Date Samples Received	: 16-Jan-2018
Order number	: W81020-103	Date Analysis Commenced	: 16-Jan-2018
C-O-C number	: ----	Issue Date	: 24-Jan-2018
Sampler	: ----		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ankit Joshi	Inorganic Chemist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Dilani Fernando	Senior Inorganic Chemist	Melbourne Inorganics, Springvale, VIC
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Nancy Wang	2IC Organic Chemist	Melbourne Organics, Springvale, VIC
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1373660)									
EM1801444-012	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	0.0287	0.0241	17.5	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.100	<0.100	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.835	0.769	8.21	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.137	0.129	6.49	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	7.88	7.17	9.46	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	3.42	2.99	13.4	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.500	<0.500	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	95.8	89.2	7.08	0% - 20%
EM1801446-004	T4C	EG020A-F: Iron	7439-89-6	0.05	mg/L	<5.00	<5.00	0.00	No Limit
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.007	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
EM1801446-009	D2	EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.03	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	3.41	3.54	3.61	0% - 20%
		EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
EM1801446-009	D2	EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.003	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1381135) - continued									
EM1801446-009	D2	EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.42	0.42	0.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EM1801643-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.019	0.018	5.64	0% - 50%
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.039	0.038	3.01	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.006	0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.03	0.02	57.1	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1373661)									
EM1801442-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.010	0.011	12.4	0% - 50%
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.003	0.004	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	2.92	3.09	5.58	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	2.00	1.94	3.04	0% - 20%
EM1801447-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.012	0.012	0.00	0% - 50%
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.074	0.074	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.005	0.004	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.071	0.067	4.92	0% - 50%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.72	0.72	0.00	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	4.09	4.04	1.29	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1388029)									
EM1801446-003	GW05	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.2	0.2	0.00	No Limit
EG094T: Total metals in Fresh water by ORC-ICPMS (QC Lot: 1388030)									
EM1801446-007	A2S	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.4	0.4	0.00	No Limit
EP1801308-001	Anonymous	EG094B-T: Selenium	7782-49-2	0.2	µg/L	0.6	0.6	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1373745)									
EM1801446-003	GW05	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.06	0.00	No Limit
EM1801458-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit

Page : 4 of 11
 Work Order : EM1801446
 Client : MRIA
 Project : Roe 8 Rehab



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1376265)									
EB1801877-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	10.6	10.1	4.65	0% - 20%
EB1801985-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.05	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1371592)									
EM1801447-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EM1801444-019	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1376230)									
EM1801446-009	D2	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EM1801526-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1373744)									
EM1801306-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.00	No Limit
EM1801446-003	GW05	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1376266)									
EB1801985-007	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.02	0.00	No Limit
EM1801526-006	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.84	4.75	1.75	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1374459)									
EB1801877-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	75.9	74.9	1.29	0% - 20%
EM1801455-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	170	173	1.98	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1376821)									
EB1801667-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1374460)									
EB1801877-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	16.3	14.5	11.8	0% - 20%
EM1801455-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	32.6	39.2	18.4	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1376822)									
EB1801667-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.42	0.38	9.86	0% - 20%
EB1801994-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	3.63	3.35	8.08	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1371586)									
EM1801446-008	A2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.03	0.00	No Limit
EM1801208-068	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	3.26	3.07	6.03	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1376231)									
EM1801446-009	D2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	0.02	0.00	No Limit
EM1801526-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.03	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1371383)									
EM1801446-006	WQA02	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1373768)									
EM1801446-001	D1	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EM1801448-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

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 Work Order : EM1801446
 Client : MRIA
 Project : Roe 8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1378457)									
EM1801631-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1371383)									
EM1801446-006	WQA02	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1373768)									
EM1801446-001	D1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EM1801448-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1378457)									
EM1801631-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1373768)									
EM1801446-001	D1	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EM1801448-011	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP080: BTEXN (QC Lot: 1378457)									
EM1801631-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1373660)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.8	93	105	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.5	91	107	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	87.3	84	104	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	87.6	83	103	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	86.9	82	103	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.4	83	105	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.3	83	105	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	88.7	82	106	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.1	85	109	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.0	94	106	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1381135)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	93	105	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.0	91	107	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.2	84	104	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.5	83	103	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	89.9	82	103	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	83	105	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.1	83	105	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	92.6	82	106	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.0	85	109	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.7	94	106	
EG020T: Total Metals by ICP-MS (QCLot: 1373661)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	104	80	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	86	111	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.9	87	109	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	88	111	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.8	87	111	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	87	113	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	104	80	120	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1388029)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	98.8	80	120	
EG094T: Total metals in Fresh water by ORC-ICPMS (QCLot: 1388030)									
EG094B-T: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	98.5	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1373745)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike	Spike Recovery (%)		Recovery Limits (%)	
					Concentration	LCS	Low	High	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1373745) - continued									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	80	115	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1376265)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	94.9	80	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1371592)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	96.3	94	107	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1376230)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	96.4	94	107	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1373744)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	110	89	114	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1376266)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	113	89	114	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1374459)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	105	70	117	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1376821)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	82.8	70	117	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1374460)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	96.7	70	120	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1376822)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	88.8	70	120	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1371586)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	104	94	108	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1376231)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	103	94	108	
EP008: Chlorophyll (QCLot: 1377269)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	100	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1371383)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	104	58	134	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	109	60	133	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	105	54	137	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1373768)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	94.1	68	125	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1376262)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	93.5	58	134	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	104	60	133	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	102	54	137	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1378457)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1378457) - continued								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	88.9	68	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1371383)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	104	58	122
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	107	56	132
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	113	58	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1373768)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	92.0	66	123
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1376262)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	99.1	58	122
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	101	56	132
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	112	58	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1378457)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	89.2	66	123
EP080: BTEXN (QCLot: 1373768)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	98.0	74	123
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	93.4	77	128
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	95.0	73	126
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	95.4	72	131
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	96.9	74	131
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	81.5	74	124
EP080: BTEXN (QCLot: 1378457)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	86.9	74	123
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	93.8	77	128
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	92.9	73	126
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	94.3	72	131
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	97.6	74	131
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	91.9	74	124

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
				MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1373660)							



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1373660) - continued							
EM1801444-012	Anonymous	EG020A-F: Arsenic	7440-38-2	2 mg/L	104	85	131
		EG020A-F: Cadmium	7440-43-9	5 mg/L	99.0	81	133
		EG020A-F: Chromium	7440-47-3	20 mg/L	95.7	71	135
		EG020A-F: Copper	7440-50-8	20 mg/L	100	76	130
		EG020A-F: Lead	7439-92-1	20 mg/L	103	75	133
		EG020A-F: Manganese	7439-96-5	20 mg/L	67.6	64	134
		EG020A-F: Nickel	7440-02-0	20 mg/L	98.4	73	131
		EG020A-F: Zinc	7440-66-6	20 mg/L	101	75	131
EG020F: Dissolved Metals by ICP-MS (QCLot: 1381135)							
EM1801446-009	D2	EG020A-F: Arsenic	7440-38-2	0.2 mg/L	97.9	85	131
		EG020A-F: Cadmium	7440-43-9	0.05 mg/L	96.3	81	133
		EG020A-F: Chromium	7440-47-3	0.2 mg/L	93.7	71	135
		EG020A-F: Copper	7440-50-8	0.2 mg/L	89.5	76	130
		EG020A-F: Lead	7439-92-1	0.2 mg/L	93.3	75	133
		EG020A-F: Manganese	7439-96-5	0.2 mg/L	93.2	64	134
		EG020A-F: Nickel	7440-02-0	0.2 mg/L	91.0	73	131
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	95.9	75	131
EG020T: Total Metals by ICP-MS (QCLot: 1373661)							
EM1801442-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	94.3	75	129
		EG020A-T: Chromium	7440-47-3	1 mg/L	88.4	80	118
		EG020A-T: Manganese	7439-96-5	1 mg/L	91.9	73	123
		EG020A-T: Nickel	7440-02-0	1 mg/L	90.4	80	118
		EG020A-T: Zinc	7440-66-6	1 mg/L	91.5	74	116
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1373745)							
EM1801446-001	D1	EK055G: Ammonia as N	7664-41-7	1 mg/L	98.2	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1376265)							
EB1801928-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	# Not Determined	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1371592)							
EM1801446-001	D1	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	86.2	80	114
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1376230)							
EM1801505-053	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	92.1	80	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1373744)							
EM1801306-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.4	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1376266)							
EB1801985-008	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	97.3	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID		Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%) Low High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1374459)							
EM1801446-001	D1	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	79.6	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1376821)							
EB1801667-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	107	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1374460)							
EM1801446-001	D1	EK067G: Total Phosphorus as P	----	1 mg/L	123	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1376822)							
EB1801667-004	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	87.4	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1371586)							
EM1801208-069	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	# Not Determined	79	123
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1376231)							
EM1801505-053	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	89.0	79	123
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1371383)							
EM1801446-006	WQA02	EP071: C10 - C14 Fraction	----	3368 µg/L	126	50	130
		EP071: C15 - C28 Fraction	----	14735 µg/L	129	54	136
		EP071: C29 - C36 Fraction	----	7856 µg/L	125	50	142
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1373768)							
EM1801441-001	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	107	43	125
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1378457)							
EM1801629-001	Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	82.0	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1371383)							
EM1801446-006	WQA02	EP071: >C10 - C16 Fraction	----	5225 µg/L	125	50	128
		EP071: >C16 - C34 Fraction	----	19994 µg/L	127	50	150
		EP071: >C34 - C40 Fraction	----	1449 µg/L	133	51	159
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1373768)							
EM1801441-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	103	44	122
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1378457)							
EM1801629-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	80.6	44	122
EP080: BTEXN (QCLot: 1373768)							
EM1801441-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	116	68	130
		EP080: Toluene	108-88-3	20 µg/L	107	72	132
EP080: BTEXN (QCLot: 1378457)							
EM1801629-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	92.4	68	130
		EP080: Toluene	108-88-3	20 µg/L	91.2	72	132



QUALITY CONTROL REPORT

Work Order	: EM1801303	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Melbourne
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 4 Westall Rd Springvale VIC Australia 3171
Telephone	: ----	Telephone	: 08 9209 7655
Project	: Roe 8 Rehab	Date Samples Received	: 12-Jan-2018
Order number	: W81020-103	Date Analysis Commenced	: 12-Jan-2018
C-O-C number	: ----	Issue Date	: 23-Jan-2018
Sampler	: ----		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 7		
No. of samples analysed	: 7		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Chris Lemaitre	Non-Metals Team Leader	Melbourne Inorganics, Springvale, VIC
Greg Vogel	Laboratory Manager	Brisbane Inorganics, Stafford, QLD
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Xing Lin	Senior Organic Chemist	Melbourne Organics, Springvale, VIC



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1373504)									
EM1801303-004	T3C	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.012	0.011	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.15	0.14	0.00	No Limit
EB1801819-013	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.009	0.009	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.50	2.57	2.83	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1373499)									
EM1801303-002	BH10	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EB1801619-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	39	36	7.34	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1368290)									

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 Work Order : EM1801303
 Client : MRIA
 Project : Roe 8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1368290) - continued										
EM1801302-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.34	0.36	5.18	0% - 20%	
EM1801303-004	T3C	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.06	49.5	No Limit	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1366481)										
EM1801297-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.02	0.02	0.00	No Limit	
EM1801297-010	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.54	0.54	0.00	0% - 20%	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1368289)										
EM1801297-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.55	0.54	0.00	0% - 20%	
EM1801297-010	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	55.8	57.6	3.26	0% - 20%	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1368291)										
EM1801303-004	T3C	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EM1801352-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.01	0.01	0.00	No Limit	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1371260)										
EB1801522-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.5	2.2	12.3	0% - 20%	
EM1801303-004	T3C	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	<0.1	0.00	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1371261)										
EB1801523-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	54.0	54.8	1.50	0% - 20%	
EM1801303-004	T3C	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1366482)										
EM1801303-001	T3B	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1366474)										
EM1801297-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EM1801297-011	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1366474)										
EM1801297-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EM1801297-011	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1366474)										
EM1801297-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EM1801297-011	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
	EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit		

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 Work Order : EM1801303
 Client : MRIA
 Project : Roe 8 Rehab



Sub-Matrix: **WATER**

				<i>Laboratory Duplicate (DUP) Report</i>					
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EP080: BTEXN (QC Lot: 1366474) - continued									
EM1801297-011	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1373504)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.1	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.4	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.8	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	102	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	98.4	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.8	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.7	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.5	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	97.8	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	110	82	114	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1373499)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	88.4	87	121	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1368290)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	80	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1366481)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	94	107	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1368289)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	101	89	114	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1368291)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.9	89	114	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1371260)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	5 mg/L	102	70	117	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1371261)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	2.21 mg/L	90.5	70	120	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1366482)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	94	108	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1366474)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	360 µg/L	101	68	125	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1368137)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	3368 µg/L	85.5	58	134	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	14735 µg/L	102	60	133	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	7856 µg/L	101	54	137	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1366474)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1366474) - continued									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	450 µg/L	97.4	66	123	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1368137)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	5225 µg/L	93.7	58	122	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	19994 µg/L	101	56	132	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	1449 µg/L	99.6	58	137	
EP080: BTEXN (QCLot: 1366474)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	102	74	123	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	100	77	128	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	73	126	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	108	72	131	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	106	74	131	
EP080: Naphthalene	91-20-3	5	µg/L	<5	5 µg/L	90.6	74	124	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%) Low High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1373504)							
EB1801819-014	Anonymous	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	95.9	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	94.5	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	93.1	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	99.2	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	95.1	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	97.0	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	96.8	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	95.1	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	95.9	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1368290)							
EM1801302-003	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	86.5	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1366481)							
EM1801297-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	98.6	80	114
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1368289)							
EM1801297-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.3	70	130



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report				
Laboratory sample ID		Client sample ID	Method: Compound	CAS Number	Spike Concentration	SpikeRecovery(%) MS	Recovery Limits (%)	
							Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1368291)								
EM1801303-005		T2F	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1371260)								
EB1801522-002		Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	98.2	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1371261)								
EB1801523-002		Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	# Not Determined	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1366482)								
EM1801303-002		BH10	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	100	79	123
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1366474)								
EM1801297-002		Anonymous	EP080: C6 - C9 Fraction	----	280 µg/L	91.8	43	125
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1366474)								
EM1801297-002		Anonymous	EP080: C6 - C10 Fraction	C6_C10	330 µg/L	87.5	44	122
EP080: BTEXN (QCLot: 1366474)								
EM1801297-002		Anonymous	EP080: Benzene	71-43-2	20 µg/L	105	68	130
			EP080: Toluene	108-88-3	20 µg/L	106	72	132

QUALITY CONTROL REPORT

Work Order	: EP1713111	Page	: 1 of 6
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 10 Hod Way Malaga WA Australia 6090
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 21-Nov-2017
Order number	: W81020-103	Date Analysis Commenced	: 21-Nov-2017
C-O-C number	: ----	Issue Date	: 28-Nov-2017
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 8		
No. of samples analysed	: 8		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Jeremy Truong	Laboratory Manager	Perth Inorganics, Malaga, WA
Kim McCabe	Senior Inorganic Chemist	Brisbane Inorganics, Stafford, QLD
Santusha Pandra	Graduate Chemist	Perth Organics, Malaga, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Malaga, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1266824)									
EP1713111-001	BH10	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.90	0.91	1.12	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	3.54	3.62	2.28	0% - 20%
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QC Lot: 1271857)									
EP1713111-001	BH10	EG094B-F: Selenium	7782-49-2	0.2	µg/L	0.7	0.6	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1259525)									
EP1713106-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EP1713108-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1259643)									
EP1713111-001	BH10	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1713115-004	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1259524)									
EP1713106-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.55	0.56	0.00	0% - 20%
EP1713108-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1263723)									
EP1713087-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	0.2	0.00	No Limit
EP1713087-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.1	<0.1	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1263722)										
EP1713087-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.04	0.00	No Limit	
EP1713087-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.02	94.9	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1263724)										
EP1713115-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.67	0.65	3.17	0% - 20%	
EP1713134-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.08	58.9	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1259644)										
EP1713111-001	BH10	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.06	0.06	0.00	No Limit	
EP1713115-004	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	1.14	1.14	0.00	0% - 20%	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1260681)										
EP1713111-003	GW-D7	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1267471)										
EP1713217-012	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1713154-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1260681)										
EP1713111-003	GW-D7	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1267471)										
EP1713217-012	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1713154-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1267471)										
EP1713217-012	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1713154-003	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1266824)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.7	79	118	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	100	88	116	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.6	88	108	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	101	87	113	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.2 mg/L	101	88	114	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	98.7	89	110	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	89	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	89	113	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.2 mg/L	98.8	87	113	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.6	82	114	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS (QCLot: 1271857)									
EG094B-F: Selenium	7782-49-2	0.2	µg/L	<0.2	10 µg/L	105	80	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1259525)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	100	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1259643)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	97.4	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1259524)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1263723)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.6	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1263722)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	96.8	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1263724)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1259644)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1260681)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	76.9	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	104	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	81.3	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1267471)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	74.1	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1260681)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1260681) - continued									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	78.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	95.2	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	98.6	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1267471)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	76.8	74	115	
EP080: BTEXN (QCLot: 1267471)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	98.6	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	101	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	86.1	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	103	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	105	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	83.5	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%) Low High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1266824)							
EP1713111-002	T3C	EG020A-F: Aluminium	7429-90-5	0.5 mg/L	95.1	70	130
		EG020A-F: Arsenic	7440-38-2	0.1 mg/L	99.0	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	98.7	70	130
		EG020A-F: Chromium	7440-47-3	0.1 mg/L	99.3	70	130
		EG020A-F: Copper	7440-50-8	0.2 mg/L	99.7	70	130
		EG020A-F: Lead	7439-92-1	0.1 mg/L	98.6	70	130
		EG020A-F: Manganese	7439-96-5	0.1 mg/L	99.5	70	130
		EG020A-F: Nickel	7440-02-0	0.1 mg/L	101	70	130
		EG020A-F: Zinc	7440-66-6	0.2 mg/L	101	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1259525)							
EP1713106-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	91.8	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1259643)							
EP1713088-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	112	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1259524)							
EP1713106-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	105	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1263723)							
EP1713087-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	93.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1263722)							
EP1713087-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	105	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1263724)							
EP1713115-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	120	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1259644)							
EP1713111-001	BH10	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1260681)							
EP1713111-003	GW-D7	EP071: C10 - C14 Fraction	----	385 µg/L	70.6	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	92.2	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	72.5	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1267471)							
EP1713217-012	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	78.8	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1260681)							
EP1713111-003	GW-D7	EP071: >C10 - C16 Fraction	----	380 µg/L	74.0	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	83.7	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	84.3	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1267471)							
EP1713217-012	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	77.6	77	137
EP080: BTEXN (QCLot: 1267471)							
EP1713217-012	Anonymous	EP080: Benzene	71-43-2	20 µg/L	100	77	122
		EP080: Toluene	108-88-3	20 µg/L	93.1	74	126

QUALITY CONTROL REPORT

Work Order	: EP1802093	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 07-Feb-2018
Order number	: W81020-103	Date Analysis Commenced	: 07-Feb-2018
C-O-C number	: ----	Issue Date	: 15-Feb-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 8		
No. of samples analysed	: 8		



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- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
David Viner	SENIOR LAB TECH	Perth Organics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

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Where moisture determination has been performed, results are reported on a dry weight basis.

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 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1426174)									
EP1802093-001	A1	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.351	0.358	1.93	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.06	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	4.05	4.08	0.718	0% - 20%
ES1804094-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.051	0.050	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.042	0.041	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.025	0.024	5.06	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.37	0.32	14.5	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1426150)									
ES1804224-001	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.007	33.2	No Limit
ES1804237-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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 Work Order : EP1802093
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1426150) - continued									
ES1804237-002	Anonymous	EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.071	0.079	9.76	0% - 50%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1804224-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1426490)									
EP1802090-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1426523)									
EP1802093-001	A1	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1418693)									
EP1802093-002	A1N	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.07	0.06	0.00	No Limit
EP1802093-003	A1E	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.05	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1418796)									
EP1802089-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802093-001	A1	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1418692)									
EP1802093-002	A1N	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802093-003	A1E	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1420641)									
EP1802052-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	5.7	6.8	16.9	0% - 50%
EP1802093-004	NLWS-N2	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	8.3	8.1	1.93	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1420640)									
EP1802052-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	5.11	5.35	4.52	0% - 20%
EP1802093-004	NLWS-N2	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.00	0.99	0.00	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1418797)									
EP1802093-001	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1426950)									
EP1802051-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1802093-001	A1	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1426950)									
EP1802051-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1802093-001	A1	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1426950)									

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 Work Order : EP1802093
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1426950) - continued									
EP1802051-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit
EP1802093-001	A1	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1426174)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.6	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.8	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.0	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	99.1	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.1	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.0	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	100	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1426150)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.1	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.7	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.8	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	98.2	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1426490)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	82.7	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1426523)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	125	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1418693)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	91.8	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1418796)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	97.0	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1418692)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.7	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1420641)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.9	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1420640)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1418797)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1418797) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	93.2	87	115	
EP008: Chlorophyll (QCLot: 1426567)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	114	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1419988)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	68.8	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	77.7	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	63.9	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1426950)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	108	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1419988)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	72.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	69.7	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	70.1	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1426950)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	111	74	115	
EP080: BTEXN (QCLot: 1426950)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	85.5	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	99.2	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	96.7	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	97.0	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	96.4	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	104	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1426174)								
EP1802093-002	A1N	EG020A-F: Arsenic	7440-38-2	1 mg/L	103	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	100	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	97.2	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	101	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	94.2	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	96.6	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1426174) - continued							
EP1802093-002	A1N	EG020A-F: Nickel	7440-02-0	1 mg/L	101	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	102	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1426150)							
EP1802093-001	A1	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	115	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	115	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	112	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	118	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	117	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1418693)							
EP1802093-001	A1	EK055G: Ammonia as N	7664-41-7	1 mg/L	77.6	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1418796)							
EP1802089-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	84.2	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1418692)							
EP1802093-001	A1	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	73.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1420641)							
EP1802052-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	95.8	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1420640)							
EP1802052-002	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	103	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1418797)							
EP1802093-001	A1	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	94.3	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1426950)							
EP1802051-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	117	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1426950)							
EP1802051-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	102	77	137
EP080: BTEXN (QCLot: 1426950)							
EP1802051-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	77.1	77	122
		EP080: Toluene	108-88-3	20 µg/L	83.8	74	126

QUALITY CONTROL REPORT

Work Order	: EP1802224	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 09-Feb-2018
Order number	: W81020-103	Date Analysis Commenced	: 09-Feb-2018
C-O-C number	: ----	Issue Date	: 19-Feb-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1432108)									
EP1802224-001	A2	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.05	0.04	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.06	0.06	0.00	No Limit		
ES1804607-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.31	0.29	6.39	0% - 20%
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1432143)									
EP1802224-001	A2	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.035	0.034	4.32	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1432143) - continued									
EP1802224-001	A2	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.13	0.14	0.00	No Limit
ES1804714-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.003	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.645	0.646	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.267	0.264	1.04	0% - 20%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.07	0.07	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	51.7	51.4	0.519	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1432508)									
EP1802224-001	A2	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1432553)									
EP1802224-001	A2	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1425110)									
EP1802224-007	GW-D4	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1802221-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	3.51	3.40	3.24	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1424951)									
EP1802171-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802224-001	A2	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1425109)									
EP1802224-007	GW-D4	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.16	2.04	5.66	0% - 20%
EP1802221-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	2.89	2.89	0.00	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1427588)									
EP1802204-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	33.8	35.2	4.07	0% - 20%
EP1802224-001	A2	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.0	3.2	6.39	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1427587)									
EP1802204-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	7.05	7.62	7.78	0% - 20%
EP1802224-001	A2	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.15	0.14	9.70	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1424950)									
EP1802171-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802224-001	A2	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1427038)									
EP1802224-003	BLNS-B1	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1436068)									
EP1802218-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit

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 Work Order : EP1802224
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1436068) - continued									
EP1802224-001	A2	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1427038)									
EP1802224-003	BLNS-B1	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1436068)									
EP1802218-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1802224-001	A2	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1436068)									
EP1802218-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1802224-001	A2	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1432108)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.0	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	99.2	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.3	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	95.7	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	97.6	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	97.2	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.6	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.8	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.0	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.1	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1432143)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	99.2	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	103	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	110	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1432508)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	98.3	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1432553)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	110	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1425110)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	95.9	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1424951)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	99.0	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1425109)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	98.8	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1427588)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	85.5	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1427587)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	92.9	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1424950)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1424950) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	97.3	87	115	
EP008: Chlorophyll (QCLot: 1427420)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	100	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1427038)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	54.9	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	69.2	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	57.7	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1436068)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	97.1	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1427038)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	57.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	62.9	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	76.1	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1436068)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	97.0	74	115	
EP080: BTEXN (QCLot: 1436068)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	105	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	102	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.8	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	101	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	106	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	107	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1432108)								
EP1802224-002	A2S	EG020A-F: Arsenic	7440-38-2	1 mg/L	102	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	99.5	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	101	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	102	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	99.6	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	100	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1432108) - continued							
EP1802224-002	A2S	EG020A-F: Nickel	7440-02-0	1 mg/L	103	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	103	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1432143)							
EP1802224-002	A2S	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	102	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	103	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	104	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	105	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1425110)							
EP1802190-003	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	102	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1424951)							
EP1802171-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1425109)							
EP1802175-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	81.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1427588)							
EP1802204-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	80.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1427587)							
EP1802204-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	80.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1424950)							
EP1802171-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	94.7	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1427038)							
EP1802224-003	BLNS-B1	EP071: C10 - C14 Fraction	----	385 µg/L	58.6	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	65.6	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	61.1	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1436068)							
EP1802218-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	109	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1427038)							
EP1802224-003	BLNS-B1	EP071: >C10 - C16 Fraction	----	380 µg/L	61.1	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	61.9	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	85.4	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1436068)							
EP1802218-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	105	77	137
EP080: BTEXN (QCLot: 1436068)							
EP1802218-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	79.8	77	122
		EP080: Toluene	108-88-3	20 µg/L	110	74	126



QUALITY CONTROL REPORT

Work Order	: EP1802359	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 13-Feb-2018
Order number	: W81020-103	Date Analysis Commenced	: 13-Feb-2018
C-O-C number	: ----	Issue Date	: 20-Feb-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Metals Instrument Chemist	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Graduate Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1438059)									
EP1802359-001	GW-D8	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.008	0.008	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.16	0.16	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.18	0.16	6.93	No Limit
ES1804784-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0010	<0.0010	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.010	0.016	44.2	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.010	<0.010	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.050	<0.050	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.10	<0.10	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.13	0.15	12.3	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1438901)									
EP1802359-009	WQA03_130218	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1438901) - continued									
EP1802359-009	WQA03_130218	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EW1800645-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	0.0002	0.0002	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.009	0.008	13.0	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.107	0.103	4.36	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.008	0.007	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.058	0.057	0.00	0% - 50%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	2.76	2.44	12.4	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	8.24	7.14	14.3	0% - 20%
		EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1438449)							
EP1802359-001	GW-D8	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1438462)									
EP1802359-009	WQA03_130218	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1431806)									
EP1802359-002	T3B	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EP1802359-005	T4C	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.19	0.17	12.7	0% - 50%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1431757)									
EP1802359-003	T3C	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802363-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1431807)									
EP1802359-002	T3B	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802359-005	T4C	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1435963)									
EP1802359-006	D1	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1435962)									
EP1802328-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	1.96	1.79	9.18	0% - 20%
EP1802358-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	20.0	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1435964)									
EP1802359-006	D1	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	<0.01	85.7	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1431758)									
EP1802359-003	T3C	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1802363-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.09	0.09	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1433112)									
EP1802364-002	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1438834)									

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 Work Order : EP1802359
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1438834) - continued									
EP1802359-001	GW-D8	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1802363-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1433112)									
EP1802364-002	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1438834)									
EP1802359-001	GW-D8	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1802363-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1438834)									
EP1802359-001	GW-D8	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1802363-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1438059)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.8	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.1	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.6	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.3	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	96.3	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	96.2	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.4	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.4	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	94.1	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.8	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1438901)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	99.3	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	100	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.8	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	101	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.5	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	102	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1438449)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	98.1	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1438462)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	91.8	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1431806)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1431757)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	100	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1431807)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	96.4	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1435963)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.8	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1435962)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	91.6	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1435964)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1435964) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.6	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1431758)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	102	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1433112)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	75.9	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	80.7	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	78.4	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1438834)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	92.2	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1433112)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	79.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	78.5	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	84.4	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1438834)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	89.8	74	115	
EP080: BTEXN (QCLot: 1438834)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	100	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	96.7	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	97.6	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	97.7	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	99.6	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	87.2	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1438059)								
EP1802359-002	T3B	EG020A-F: Arsenic	7440-38-2	1 mg/L	96.8	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	99.4	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	104	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	99.0	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	99.7	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	104	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1438059) - continued							
EP1802359-002	T3B	EG020A-F: Nickel	7440-02-0	1 mg/L	98.3	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	99.6	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1438901)							
ES1804766-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	97.1	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	100	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	101	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	96.8	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.4	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1431806)							
EP1802359-001	GW-D8	EK055G: Ammonia as N	7664-41-7	1 mg/L	106	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1431757)							
EP1802363-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	106	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1431807)							
EP1802359-001	GW-D8	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	85.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1435963)							
EP1802359-006	D1	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1435962)							
EP1802328-001	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	130	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1435964)							
EP1802359-006	D1	EK067G: Total Phosphorus as P	----	1 mg/L	100	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1431758)							
EP1802363-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	103	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1433112)							
EP1802364-002	Anonymous	EP071: C10 - C14 Fraction	----	385 µg/L	78.9	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	91.0	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	84.6	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1438834)							
EP1802359-002	T3B	EP080: C6 - C9 Fraction	----	240 µg/L	99.8	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1433112)							
EP1802364-002	Anonymous	EP071: >C10 - C16 Fraction	----	380 µg/L	83.4	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	87.7	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	92.2	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1438834)							
EP1802359-002	T3B	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	84.6	77	137

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 Work Order : EP1802359
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
		<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>			
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 1438834)							
EP1802359-002	T3B	EP080: Benzene	71-43-2	20 µg/L	80.4	77	122
		EP080: Toluene	108-88-3	20 µg/L	74.5	74	126

QUALITY CONTROL REPORT

Work Order	: EP1804348	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 04-Apr-2018
Order number	: W81020-103	Date Analysis Commenced	: 04-Apr-2018
C-O-C number	: ----	Issue Date	: 13-Apr-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 14		
No. of samples analysed	: 14		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA
Vanessa Nguyen	Organic Chemist	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1554880)									
EP1804348-001	GW-T3E-A	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.30	0.31	0.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.38	0.37	0.00	No Limit
EP1804350-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.06	27.4	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1554898)									
EP1804348-008	WQA03_040418	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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 Work Order : EP1804348
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1554898) - continued									
EP1804348-008	WQA03_040418	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1809764-006	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.044	0.044	2.39	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1551918)									
EP1804348-001	GW-T3E-A	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EP1804348-013	A2S	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1551933)									
EP1804348-008	WQA03_040418	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1559106)									
EP1804348-001	GW-T3E-A	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.36	0.37	0.00	0% - 20%
EP1804348-013	A2S	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.06	0.06	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1543653)									
EP1804348-002	T2F	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1804348-013	A2S	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1559107)									
EP1804348-001	GW-T3E-A	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1804348-013	A2S	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1558401)									
EP1804348-001	GW-T3E-A	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.7	0.00	No Limit
EP1804348-013	A2S	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.3	4.4	3.95	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1558400)									
EP1804348-001	GW-T3E-A	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.06	0.00	No Limit
EP1804348-013	A2S	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.13	0.14	9.94	0% - 50%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1543652)									
EP1804348-002	T2F	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1804348-013	A2S	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1548834)									
EP1804347-005	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1804348-010	WQA01_040418	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1548834)									
EP1804347-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit

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 Work Order : EP1804348
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1548834) - continued									
EP1804348-010	WQA01_040418	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1548834)									
EP1804347-005	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1804348-010	WQA01_040418	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1554880)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.4	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.0	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.4	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.0	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.6	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.0	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.2	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	95.8	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.0	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.8	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1554898)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.1	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.5	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.0	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.2	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.6	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.9	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.1	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1551918)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	99.1	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1551933)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	109	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1559106)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	107	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1543653)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1559107)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.2	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1558401)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	84.6	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1558400)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	104	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1543652)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1543652) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	110	87	115	
EP008: Chlorophyll (QCLot: 1551830)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	94.4	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1548801)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	54.2	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	62.5	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	52.4	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1548834)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	96.2	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1548801)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	57.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	57.4	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	52.5	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1548834)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	95.0	74	115	
EP080: BTEXN (QCLot: 1548834)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	111	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	102	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	100	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	102	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	100	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1554880)								
EP1804348-002	T2F	EG020A-F: Arsenic	7440-38-2	1 mg/L	104	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	106	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	104	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	104	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	102	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	102	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1554880) - continued							
EP1804348-002	T2F	EG020A-F: Nickel	7440-02-0	1 mg/L	106	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	104	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1554898)							
EP1804348-011	BLNS-B1	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	103	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.4	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	96.0	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	102	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	101	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1559106)							
EP1804348-001	GW-T3E-A	EK055G: Ammonia as N	7664-41-7	1 mg/L	88.7	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1543653)							
EP1804348-001	GW-T3E-A	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	101	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1559107)							
EP1804348-001	GW-T3E-A	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1558401)							
EP1804348-002	T2F	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	90.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1558400)							
EP1804348-002	T2F	EK067G: Total Phosphorus as P	----	1 mg/L	97.3	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1543652)							
EP1804348-001	GW-T3E-A	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	109	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1548834)							
EP1804347-005	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	88.7	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1548834)							
EP1804347-005	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	86.3	77	137
EP080: BTEXN (QCLot: 1548834)							
EP1804347-005	Anonymous	EP080: Benzene	71-43-2	20 µg/L	103	77	122
		EP080: Toluene	108-88-3	20 µg/L	91.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1803361	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 09-Mar-2018
Order number	: W81020-103	Date Analysis Commenced	: 09-Mar-2018
C-O-C number	: ----	Issue Date	: 16-Mar-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1493749)									
EP1803361-001	T3B	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.005	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.76	0.84	10.1	0% - 50%
ES1807416-011	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.370	0.367	0.837	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.17	0.16	8.85	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.29	0.36	21.4	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1493616)									
EP1803361-004	NLWS-N2	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.478	0.467	2.36	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1493616) - continued									
EP1803361-004	NLWS-N2	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.03	0.02	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	7.31	7.12	2.69	0% - 20%
ES1807455-019	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.01	<0.01	0.00	No Limit
		EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1493823)							
EP1803361-001	T3B	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1493894)									
EP1803361-004	NLWS-N2	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1485969)									
EP1803267-003	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.00	No Limit
EP1803267-005	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.03	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1486195)									
EP1803361-001	T3B	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1803370-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1485970)									
EP1803267-003	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1803267-005	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1495599)									
EP1803348-006	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.2	1.4	14.9	No Limit
EP1803361-007	A2	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	3.6	3.5	3.03	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1495597)									
EP1803019-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.00	No Limit
EP1803348-006	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.09	0.13	33.7	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1495600)									
EP1803361-007	A2	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.10	0.00	0% - 50%
EP1803372-005	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.11	9.70	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1486192)									
EP1803361-001	T3B	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1803370-003	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1487890)									
EP1803267-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP1803267-003	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit

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 Work Order : EP1803361
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1488049)										
EP1803375-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP1803354-002	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	200	200	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1487890)										
EP1803267-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit	
EP1803267-003	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1488049)										
EP1803375-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP1803354-002	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	200	190	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080: BTEXN (QC Lot: 1487890)										
EP1803267-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
EP1803267-003	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
	EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1493749)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.0	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	99.2	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.2	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	98.3	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.7	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.2	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.9	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	100	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.0	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1493616)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.5	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	98.9	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.4	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.5	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.7	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.6	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1493823)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	95.1	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1493894)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	95.6	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1485969)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	96.9	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1486195)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1485970)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	105	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1495599)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	90.0	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1495597)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	86.8	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1495600)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1495600) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	88.3	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1486192)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	106	87	115	
EP008: Chlorophyll (QCLot: 1487614)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	90.6	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1487890)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	94.3	74	113	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1488049)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	55.6	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	72.7	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	54.7	34	105	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1487890)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	94.9	74	115	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1488049)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	58.3	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	65.9	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	43.0	11	117	
EP080: BTEXN (QCLot: 1487890)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	92.9	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	91.7	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.2	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	97.0	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	110	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1493749)								
EP1803361-002	T3C	EG020A-F: Arsenic	7440-38-2	1 mg/L	100	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	99.1	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	99.3	70	130	



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1493749) - continued							
EP1803361-002	T3C	EG020A-F: Copper	7440-50-8	1 mg/L	98.4	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	104	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	98.5	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	98.2	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	99.1	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1493616)							
EP1803361-005	A2S	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	104	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	103	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	91.2	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	106	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1485969)							
EP1803267-002	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	123	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1486195)							
EP1803361-001	T3B	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	106	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1485970)							
EP1803267-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	83.5	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1495599)							
EP1803361-010	WQA02_090318	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	92.6	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1495597)							
EP1803348-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	102	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1495600)							
EP1803361-010	WQA02_090318	EK067G: Total Phosphorus as P	----	1 mg/L	101	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1486192)							
EP1803361-001	T3B	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	108	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1487890)							
EP1803267-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	106	77	137
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1488049)							
EP1803361-006	BLNS-B1	EP071: C10 - C14 Fraction	----	385 µg/L	67.6	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	70.9	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	60.0	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1487890)							
EP1803267-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	122	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1488049)							
EP1803361-006	BLNS-B1	EP071: >C10 - C16 Fraction	----	380 µg/L	68.7	45	122

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 Work Order : EP1803361
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				<i>Matrix Spike (MS) Report</i>			
				<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1488049) - continued							
EP1803361-006	BLNS-B1	EP071: >C16 - C34 Fraction	----	597 µg/L	65.3	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	55.6	54	128
EP080: BTEXN (QCLot: 1487890)							
EP1803267-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	107	77	122
		EP080: Toluene	108-88-3	20 µg/L	86.4	74	126

QUALITY CONTROL REPORT

Work Order	: EP1803480	Page	: 1 of 6
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 13-Mar-2018
Order number	: W181020-103	Date Analysis Commenced	: 13-Mar-2018
C-O-C number	: ----	Issue Date	: 20-Mar-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 4		
No. of samples analysed	: 4		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1500226)									
EP1803480-001	GW-D4	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.030	0.018	49.0	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.38	0.40	6.30	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.10	0.10	0.00	No Limit
ES1807618-008	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	1.18	1.13	4.98	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.08	0.10	21.2	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1500465)									
EP1803480-001	GW-D4	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1492891)									
EP1803480-002	GW-D8	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.09	0.00	No Limit

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 Work Order : EP1803480
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1492891) - continued										
EP1803480-003	BH12	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.01	0.00	No Limit	
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1493264)										
EP1803493-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1803493-011	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1492892)										
EP1803480-002	GW-D8	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.05	0.05	0.00	No Limit	
EP1803480-003	BH12	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.72	4.68	0.744	0% - 20%	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1498665)										
EP1803470-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit	
EP1803487-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.0	0.6	40.3	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1498664)										
EP1803470-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1803487-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.02	0.03	0.00	No Limit	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1493263)										
EP1803493-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.03	0.00	No Limit	
EP1803493-011	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.04	0.04	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1494318)										
EP1803457-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1803470-004	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1494318)										
EP1803457-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1803470-004	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1494318)										
EP1803457-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1803470-004	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1500226)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	86.5	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	90.9	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.8	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.9	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	88.4	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	89.3	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	90.5	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	89.4	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.5	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	90.6	82	112	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1500465)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	100	74	130	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1492891)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	101	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1493264)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1492892)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	102	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1498665)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	86.0	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1498664)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.5	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1493263)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	97.5	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1494318)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	113	74	113	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1494356)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	72.2	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	83.3	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	53.7	34	105	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1494318)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	113	74	115	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1494356)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1494356) - continued								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	74.9	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	71.2	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	29.2	11	117
EP080: BTEXN (QCLot: 1494318)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	110	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	108	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	109	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	112	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	108	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	113	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%) Low High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1500226)							
EP1803480-002	GW-D8	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.8	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	90.7	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	89.8	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.9	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	90.0	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	89.6	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.1	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1492891)							
EP1803480-001	GW-D4	EK055G: Ammonia as N	7664-41-7	1 mg/L	99.7	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1493264)							
EP1803493-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	106	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1492892)							
EP1803480-001	GW-D4	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1498665)							
EP1803470-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	89.4	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1498664)							
EP1803470-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	97.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1493263)							
EP1803493-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	88.4	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1494318)							
EP1803457-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	91.9	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1494318)							
EP1803457-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	95.4	77	137
EP080: BTEXN (QCLot: 1494318)							
EP1803457-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	78.0	77	122
		EP080: Toluene	108-88-3	20 µg/L	86.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1803299	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 08-Mar-2018
Order number	: W81020-103	Date Analysis Commenced	: 08-Mar-2018
C-O-C number	: ----	Issue Date	: 16-Mar-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 11		
No. of samples analysed	: 11		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Daniel Fisher	Inorganics Analyst	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Raymond Commodore	Instrument Chemist	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1490230)									
EP1803299-001	GW-T3E-A	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.007	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.40	0.40	0.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.44	0.43	0.00	No Limit
EW1800786-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.136	0.136	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1487760)									
EP1803299-009	WQA03_080318	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1487760) - continued									
EP1803299-009	WQA03_080318	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1807310-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.002	0.005	81.1	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.008	0.009	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.10	0.07	39.7	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.11	0.40	112	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1487471)									
EP1803299-001	GW-T3E-A	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1487529)									
ES1807081-001	Anonymous	EG093B-T: Selenium	7782-49-2	2	µg/L	<1	<1	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1482906)									
EP1803299-002	GW-D3	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.03	0.04	0.00	No Limit
EP1803299-011	T2F	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.38	0.37	0.00	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1482801)									
EP1803299-005	T4C	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1803265-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.03	0.03	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1482907)									
EP1803299-002	GW-D3	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.22	0.22	0.00	0% - 20%
EP1803299-011	T2F	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1494436)									
EP1803289-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.3	0.2	53.8	No Limit
EP1803299-011	T2F	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.7	0.7	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1494435)									
EP1803289-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1803299-011	T2F	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.02	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1482802)									
EP1803299-005	T4C	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1803265-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1484283)									
EP1803283-014	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1803299-004	T4B	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1484317)									
EP1803299-001	GW-T3E-A	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit

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 Work Order : EP1803299
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1484317) - continued									
EP1803299-001	GW-T3E-A	EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1484283)									
EP1803283-014	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1803299-004	T4B	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1484317)									
EP1803299-001	GW-T3E-A	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
EP080: BTEXN (QC Lot: 1484283)									
EP1803283-014	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1803299-004	T4B	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1490230)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.9	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	96.8	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.8	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.4	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.9	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	93.9	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	99.1	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.9	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	97.7	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	96.9	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1487760)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.9	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	98.4	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.8	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	102	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	99.7	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	115	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	99.1	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1487471)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	114	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1487529)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	118	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1482906)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	97.7	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1482801)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	105	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1482907)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	104	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1494436)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	82.5	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1494435)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	86.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1482802)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1482802) - continued								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	108	87	115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1484283)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	107	74	113
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1484317)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	81.3	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	85.8	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	88.3	34	105
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1484283)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	109	74	115
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1484317)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	84.8	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	84.2	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	111	11	117
EP080: BTEXN (QCLot: 1484283)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	105	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	103	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	106	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	105	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	104	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	105	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
					MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1490230)							
EP1803299-001	GW-T3E-A	EG020A-F: Arsenic	7440-38-2	1 mg/L	104	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	103	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	101	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	104	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	112	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	103	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	101	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	103	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1487760)							
ES1807288-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	98.3	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	96.3	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	# Not Determined	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	98.4	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	97.1	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1482906)							
EP1803299-001	GW-T3E-A	EK055G: Ammonia as N	7664-41-7	1 mg/L	92.1	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1482801)							
EP1803299-001	GW-T3E-A	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	111	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1482907)							
EP1803299-001	GW-T3E-A	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.7	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1494436)							
EP1803299-001	GW-T3E-A	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	88.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1494435)							
EP1803299-001	GW-T3E-A	EK067G: Total Phosphorus as P	----	1 mg/L	99.3	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1482802)							
EP1803299-001	GW-T3E-A	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	97.8	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1484283)							
EP1803283-015	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	103	77	137
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1484317)							
EP1803299-001	GW-T3E-A	EP071: C10 - C14 Fraction	----	385 µg/L	83.9	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	85.0	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	67.6	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1484283)							
EP1803283-015	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	83.2	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1484317)							
EP1803299-001	GW-T3E-A	EP071: >C10 - C16 Fraction	----	380 µg/L	86.0	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	76.9	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	58.2	54	128
EP080: BTEXN (QCLot: 1484283)							
EP1803283-015	Anonymous	EP080: Benzene	71-43-2	20 µg/L	119	77	122
		EP080: Toluene	108-88-3	20 µg/L	88.4	74	126

QUALITY CONTROL REPORT

Work Order	: EP1804292	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 03-Apr-2018
Order number	: W81020-103	Date Analysis Commenced	: 03-Apr-2018
C-O-C number	: ----	Issue Date	: 11-Apr-2018
Sampler	: Rachel Champion		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 9		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Jeremy Truong	Laboratory Manager	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1551707)									
EP1804292-001	GW-D3	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.44	0.40	10.8	No Limit
EP1804332-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.027	0.026	4.37	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1551721)									
EP1804292-008	WQA03_030418	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1551721) - continued									
EP1804292-008	WQA03_030418	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1809713-005	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.025	0.025	0.00	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.003	0.004	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.04	0.05	30.2	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1547807)									
EP1804292-001	GW-D3	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1548435)									
EP1804292-008	WQA03_030418	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1556952)									
EP1804292-001	GW-D3	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EP1804298-004	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1540575)									
EP1804282-009	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1804282-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1556953)									
EP1804292-001	GW-D3	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.30	0.31	0.00	0% - 20%
EP1804298-004	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1552670)									
EP1804282-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.3	2.1	8.12	No Limit
EP1804298-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.4	0.00	0% - 50%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1552669)									
EP1804282-009	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.09	<0.05	56.6	No Limit
EP1804298-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.22	0.19	17.6	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1540574)									
EP1804282-009	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.01	<0.01	0.00	No Limit
EP1804282-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1549724)									
EP1804292-001	GW-D3	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1804326-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<0.02 mg/L	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1549724)									
EP1804292-001	GW-D3	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1804326-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<0.02 mg/L	<20	0.00	No Limit

Page : 4 of 7
 Work Order : EP1804292
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1549724)									
EP1804292-001	GW-D3	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1804326-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<0.001 mg/L	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<0.002 mg/L	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<0.005 mg/L	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1551707)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	89.9	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	90.7	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	88.7	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	86.0	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	87.5	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.0	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.9	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	85.6	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	87.2	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	86.6	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1551721)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	97.8	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.0	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.7	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	91.1	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	98.3	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.4	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.7	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1547807)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	92.9	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1548435)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	87.5	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1556952)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1540575)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	101	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1556953)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1552670)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.3	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1552669)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.8	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1540574)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1540574) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1541642)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	65.8	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	65.1	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	76.2	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1549724)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	102	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1541642)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	68.0	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	69.7	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	65.5	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1549724)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	111	74	115	
EP080: BTEXN (QCLot: 1549724)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	107	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	108	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	113	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	106	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	102	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1551707)								
EP1804292-002	GW-D4	EG020A-F: Arsenic	7440-38-2	1 mg/L	102	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	104	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	97.3	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	101	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	99.0	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	101	70	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	103	70	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	106	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1551721)							
EP1804335-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	101	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	99.3	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	91.6	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	104	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1556952)							
EP1804292-001	GW-D3	EK055G: Ammonia as N	7664-41-7	1 mg/L	102	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1540575)							
EP1804282-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	102	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1556953)							
EP1804292-001	GW-D3	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	96.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1552670)							
EP1804282-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	85.7	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1552669)							
EP1804282-009	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	93.3	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1540574)							
EP1804277-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	110	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1549724)							
EP1804292-002	GW-D4	EP080: C6 - C9 Fraction	----	240 µg/L	95.3	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1549724)							
EP1804292-002	GW-D4	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	92.4	77	137
EP080: BTEXN (QCLot: 1549724)							
EP1804292-002	GW-D4	EP080: Benzene	71-43-2	20 µg/L	93.4	77	122
		EP080: Toluene	108-88-3	20 µg/L	86.3	74	126

QUALITY CONTROL REPORT

Work Order	: EP1805453	Page	: 1 of 10
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 02-May-2018
Order number	: W81020-103	Date Analysis Commenced	: 02-May-2018
C-O-C number	: ----	Issue Date	: 10-May-2018
Sampler	: Danielle Sullivan		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 11		
No. of samples analysed	: 11		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1623371)									
EN1802775-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.606	0.610	0.718	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.017	0.018	0.00	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.026	0.019	34.6	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EP1805453-006	GW-D4_020518	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.40	0.43	5.96	0% - 20%
EG020A-F: Iron	7439-89-6	0.05	mg/L	0.11	0.11	0.00	No Limit		
EG020T: Total Metals by ICP-MS (QC Lot: 1621795)									
EP1805453-001	BLNS-B1_020518	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.026	0.024	11.4	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1621795) - continued									
EP1805453-001	BLNS-B1_020518	EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.019	<0.005	115	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.07	0.08	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.17	0.17	0.00	No Limit
ES1812735-003	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.150	0.141	6.31	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.03	0.02	44.4	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.27	0.24	8.28	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1620555)									
EP1805453-001	BLNS-B1_020518	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1620577)									
EP1805453-001	BLNS-B1_020518	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1612393)									
EP1805453-002	A2_020518	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EP1805453-006	GW-D4_020518	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1612549)									
EP1805453-002	A2_020518	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805453-011	D1_020518	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1612394)									
EP1805453-002	A2_020518	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805453-006	GW-D4_020518	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.33	4.32	0.254	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1621867)									
EP1805423-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	<0.1	0.00	No Limit
EP1805423-011	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.5	<0.5	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1621869)									
EP1805453-002	A2_020518	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	4.0	3.9	0.00	0% - 20%
EP1805526-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.5	2.4	4.22	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1621866)									
EP1805423-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805423-011	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.34	0.23	38.5	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1621868)									
EP1805453-002	A2_020518	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.05	0.07	23.3	No Limit
EP1805526-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.84	0.85	1.32	0% - 20%
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1612548)									
EP1805453-002	A2_020518	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805453-011	D1_020518	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1613641)										
EP1805453-005	GW-D3_020518	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1621693)										
EP1805422-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	202000	186000	8.11	0% - 20%	
EP1805446-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1624513)										
EP1805447-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1805453-011	D1_020518	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1613641)										
EP1805453-005	GW-D3_020518	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1621693)										
EP1805422-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	238000	218000	8.69	0% - 20%	
EP1805446-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1624513)										
EP1805447-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1805453-011	D1_020518	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1621693)										
EP1805422-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	24000	22200	7.76	0% - 20%	
		EP080: Toluene	108-88-3	2	µg/L	110000	108000	1.58	0% - 20%	
		EP080: Ethylbenzene	100-41-4	2	µg/L	6330	5360	16.5	0% - 20%	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	23600	21400	9.30	0% - 20%	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	9630	9050	6.28	0% - 20%	
EP1805446-002	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	266	232	14.1	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			
EP080: BTEXN (QC Lot: 1624513)										
EP1805447-002	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	

Page : 5 of 10
 Work Order : EP1805453
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1624513) - continued									
EP1805447-002	Anonymous	EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP1805453-011	D1_020518	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit
			106-42-3						
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit		



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1623371)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.6	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	92.5	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.9	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.6	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.9	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	92.9	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.0	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.1	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.9	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.8	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1621795)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.6	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	92.5	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.0	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	89.3	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	93.6	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	90.3	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	94.9	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1620555)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	107	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1620577)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	91.2	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1612393)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1612549)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1612394)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1621867)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	95.5	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1621869)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	93.7	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1621866)									



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1621866) - continued									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	86.1	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1621868)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	83.3	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1612548)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	96.9	87	115	
EP008: Chlorophyll (QCLot: 1621727)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	115	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1613640)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	58.0	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	72.4	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	76.8	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1613641)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	400 µg/L	58.8	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	400 µg/L	71.0	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	400 µg/L	66.5	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1621693)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	99.6	74	113	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1624513)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	90.1	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1613640)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	63.8	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	75.8	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	62.2	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1613641)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	400 µg/L	63.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	600 µg/L	69.8	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	200 µg/L	56.9	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1621693)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	75.3	74	115	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1624513)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	88.2	74	115	
EP080: BTEXN (QCLot: 1621693)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	96.5	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	99.6	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	90.1	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	92.6	84	114	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080: BTEXN (QCLot: 1621693) - continued									
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	102	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	103	77	118	
EP080: BTEXN (QCLot: 1624513)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	100	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	98.5	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	99.1	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	105	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	114	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%) Low High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1623371)							
EN1802775-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	93.0	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	94.1	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.9	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	93.4	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	83.9	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	93.6	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	92.7	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	93.6	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1621795)							
EP1805453-002	A2_020518	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	92.9	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	93.4	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	88.9	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	94.8	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	93.3	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1612393)							
EP1805453-001	BLNS-B1_020518	EK055G: Ammonia as N	7664-41-7	1 mg/L	93.5	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1612549)							
EP1805453-001	BLNS-B1_020518	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1612394)							
EP1805453-001	BLNS-B1_020518	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	101	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1621867)							
EP1805423-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	96.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1621869)							
EP1805453-003	A2S_020518	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	99.5	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1621866)							
EP1805423-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	85.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1621868)							
EP1805453-003	A2S_020518	EK067G: Total Phosphorus as P	----	1 mg/L	93.5	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1612548)							
EP1805453-001	BLNS-B1_020518	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	115	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1613641)							
EP1805467-001	Anonymous	EP071: C10 - C14 Fraction	----	400 µg/L	69.3	45	122
		EP071: C15 - C28 Fraction	----	400 µg/L	64.4	55	143
		EP071: C29 - C36 Fraction	----	400 µg/L	61.3	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1621693)							
EP1805422-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	# Not Determined	77	137
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1624513)							
EP1805453-001	BLNS-B1_020518	EP080: C6 - C9 Fraction	----	240 µg/L	84.5	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1613641)							
EP1805467-001	Anonymous	EP071: >C10 - C16 Fraction	----	400 µg/L	66.8	45	122
		EP071: >C16 - C34 Fraction	----	600 µg/L	63.5	55	143
		EP071: >C34 - C40 Fraction	----	200 µg/L	57.5	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1621693)							
EP1805422-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	# Not Determined	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1624513)							
EP1805453-001	BLNS-B1_020518	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	81.8	77	137
EP080: BTEXN (QCLot: 1621693)							
EP1805422-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	# Not Determined	77	122
		EP080: Toluene	108-88-3	20 µg/L	# Not Determined	74	126

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 Work Order : EP1805453
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				<i>Matrix Spike (MS) Report</i>			
				<i>Spike</i>	<i>SpikeRecovery(%)</i>	<i>Recovery Limits (%)</i>	
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>Concentration</i>	<i>MS</i>	<i>Low</i>	<i>High</i>
EP080: BTEXN (QCLot: 1624513)							
EP1805453-001	BLNS-B1_020518	EP080: Benzene	71-43-2	20 µg/L	93.3	77	122
		EP080: Toluene	108-88-3	20 µg/L	86.6	74	126

QUALITY CONTROL REPORT

Work Order	: EP1805524	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 03-May-2018
Order number	: W81020-103	Date Analysis Commenced	: 03-May-2018
C-O-C number	: ----	Issue Date	: 14-May-2018
Sampler	: Danielle Sullivan		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 1624837)									
EP1805521-026	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.80	7.82	0.256	0% - 20%
EP1805521-036	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	7.91	7.96	0.630	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 1624838)									
EP1805521-036	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1260	1260	0.471	0% - 20%
EP1805533-001	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	1280	1300	1.38	0% - 20%
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 1625891)									
EP1805549-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	424	422	0.473	0% - 20%
EP1805475-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	4190	4230	0.950	0% - 20%
EA041: Colour (True) (QC Lot: 1616023)									
EP1805489-001	Anonymous	EA041: Colour (True)	----	1	PCU	<1	<1	0.00	No Limit
		EA041: pH Colour	----	0.01	pH Unit	8.08	8.10	0.247	0% - 20%
EA075: Redox Potential (QC Lot: 1616024)									
EP1805524-009	KA_030518	EA075: Redox Potential	----	0.1	mV	44.7	44.5	0.448	0% - 20%
		EA075: pH Redox	----	0.01	pH Unit	6.83	6.85	0.292	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1624839)									
EP1805651-002	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	835	826	1.13	0% - 20%
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	130	132	1.57	0% - 20%
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	965	957	0.764	0% - 20%
EP1805569-001	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	214	198	7.71	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	214	198	7.71	0% - 20%
ED038A: Acidity (QC Lot: 1624785)									

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 Work Order : EP1805524
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED038A: Acidity (QC Lot: 1624785) - continued									
EP1805242-001	Anonymous	ED038: Acidity as CaCO3	----	1	mg/L	23	25	8.00	0% - 20%
EP1805520-001	Anonymous	ED038: Acidity as CaCO3	----	1	mg/L	20	20	0.00	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1630401)									
EP1805520-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	733	794	7.95	0% - 20%
EP1805542-017	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	301	298	1.06	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 1630402)									
EP1805520-001	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	5960	5920	0.678	0% - 20%
EP1805542-017	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	3550	3280	7.85	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1626141)									
EP1805519-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	75	78	3.64	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	30	30	0.00	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	337	345	2.20	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	17	17	0.00	0% - 50%
EP1805616-003	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	443	438	1.26	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	1380	1360	1.06	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	9810	9720	0.926	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	539	539	0.00	0% - 20%
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1625651)									
EP1805524-001	T3B_030518	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.005	0.005	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.13	0.13	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.94	0.94	0.00	0% - 50%
ES1812921-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.453	0.451	0.444	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.010	0.010	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.26	0.26	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1625647)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1625647) - continued									
EN1802829-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.006	0.006	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.002	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.219	0.227	3.70	0% - 20%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.02	0.02	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1812997-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	1.66	1.62	1.91	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.180	0.183	1.76	0% - 20%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.024	0.024	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.08	0.08	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	19.8	19.8	0.240	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1625904)									
EP1805524-001	T3B_030518	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1625939)									
EP1805524-008	WQA03_030518	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1615963)									
EP1805519-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.20	0.19	0.00	0% - 50%
EP1805524-010	BH10_030518	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1615951)									
EP1805524-002	T4B_030518	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805526-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1615964)									
EP1805519-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1805524-010	BH10_030518	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.08	0.08	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1627038)									
EP1805242-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.3	1.2	0.00	No Limit
EP1805520-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.8	0.8	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1627037)									
EP1805242-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.09	0.08	0.00	No Limit
EP1805520-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1615952)									
EP1805524-002	T4B_030518	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.29	0.30	4.50	0% - 20%
EP1805526-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.02	<0.01	0.00	No Limit
EP025: Oxygen - Dissolved (DO) (QC Lot: 1616021)									
EP1805495-001	Anonymous	EP025: Dissolved Oxygen	----	0.1	mg/L	5.8	5.9	0.00	0% - 20%

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 Work Order : EP1805524
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP025: Oxygen - Dissolved (DO) (QC Lot: 1616021) - continued										
EP1805495-011	Anonymous	EP025: Dissolved Oxygen	----	0.1	mg/L	8.0	8.0	0.00	0% - 20%	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1617171)										
EP1805524-006	GW-T3E-A_030518	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1626602)										
EP1805524-001	T3B_030518	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1805528-002	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1617171)										
EP1805524-006	GW-T3E-A_030518	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1626602)										
EP1805524-001	T3B_030518	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1805528-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1626602)										
EP1805524-001	T3B_030518	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1805528-002	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA005P: pH by PC Titrator (QCLot: 1624837)									
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	99	102	
				----	7 pH Unit	99.7	99	102	
EA010P: Conductivity by PC Titrator (QCLot: 1624838)									
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	97.1	95	105	
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 1625891)									
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	105	83	111	
				<10	1000 mg/L	105	70	130	
EA041: Colour (True) (QCLot: 1616023)									
EA041: Colour (True)	----	1	PCU	<1	20 PCU	100	70	130	
ED037P: Alkalinity by PC Titrator (QCLot: 1624839)									
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	----	----	----	----	
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----	
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	108	76	126	
				<1	200 mg/L	99.0	90	106	
ED038A: Acidity (QCLot: 1624785)									
ED038: Acidity as CaCO3	----	----	mg/L	----	20 mg/L	96.0	85	119	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1630401)									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	101	89	113	
				<1	100 mg/L	99.6	79	121	
ED045G: Chloride by Discrete Analyser (QCLot: 1630402)									
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	90.9	84	120	
				<1	1000 mg/L	108	84	110	
ED093F: Dissolved Major Cations (QCLot: 1626141)									
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	99.8	91	109	
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	98.4	90	108	
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	107	87	111	
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	97.5	90	110	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1625651)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	96.8	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.2	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	94.2	84	110	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1625651) - continued								
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.4	85	111
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.9	81	111
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.8	83	111
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.0	82	110
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.5	82	112
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	93.3	81	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	91.3	82	112
EG020T: Total Metals by ICP-MS (QCLot: 1625647)								
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	94.8	82	120
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	96.2	84	112
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	96.8	86	116
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	98.4	85	113
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.5	84	116
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	99.5	79	117
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.3	85	117
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1625904)								
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	110	74	130
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1625939)								
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	110	80	138
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1615963)								
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	87	115
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1615951)								
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1615964)								
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	103	92	112
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1627038)								
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	90.7	82	110
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1627037)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	85.2	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1615952)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	110	87	115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1617171)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	66.9	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	67.1	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	398 µg/L	66.0	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1626602)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	102	74	113



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1617171)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	380 µg/L	68.1	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	65.6	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	74.2	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1626602)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	103	74	115	
EP080: BTEXN (QCLot: 1626602)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	101	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	106	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	109	84	113	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	40 µg/L	109	84	114	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	110	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	118	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: WATER

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1630401)								
EP1805520-001	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	# Not Determined	70	130	
ED045G: Chloride by Discrete Analyser (QCLot: 1630402)								
EP1805520-001	Anonymous	ED045G: Chloride	16887-00-6	1000 mg/L	# Not Determined	70	130	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1625651)								
EP1805524-002	T4B_030518	EG020A-F: Arsenic	7440-38-2	1 mg/L	94.7	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	97.6	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	96.1	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	96.9	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	105	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	96.3	70	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	97.9	70	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	97.4	70	130	
EG020T: Total Metals by ICP-MS (QCLot: 1625647)								
EN1802829-002	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	99.8	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1625647) - continued							
EN1802829-002	Anonymous	EG020A-T: Chromium	7440-47-3	1 mg/L	105	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	101	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	100.0	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	95.9	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1615963)							
EP1805519-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	99.7	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1615951)							
EP1805524-001	T3B_030518	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	112	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1615964)							
EP1805519-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	103	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1627038)							
EP1805242-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	10 mg/L	97.9	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1627037)							
EP1805242-001	Anonymous	EK067G: Total Phosphorus as P	----	2 mg/L	87.7	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1615952)							
EP1805524-001	T3B_030518	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	111	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1617171)							
EP1805524-007	WQA01_030518	EP071: C10 - C14 Fraction	----	385 µg/L	71.2	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	77.8	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	83.7	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1626602)							
EP1805524-002	T4B_030518	EP080: C6 - C9 Fraction	----	240 µg/L	101	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1617171)							
EP1805524-007	WQA01_030518	EP071: >C10 - C16 Fraction	----	380 µg/L	72.4	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	81.0	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	93.2	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1626602)							
EP1805524-002	T4B_030518	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	110	77	137
EP080: BTEXN (QCLot: 1626602)							
EP1805524-002	T4B_030518	EP080: Benzene	71-43-2	20 µg/L	97.9	77	122
		EP080: Toluene	108-88-3	20 µg/L	97.8	74	126

QUALITY CONTROL REPORT

Work Order	: EP1806724	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 31-May-2018
Order number	: W81020-103	Date Analysis Commenced	: 31-May-2018
C-O-C number	: ----	Issue Date	: 11-Jun-2018
Sampler	: ----		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 5		
No. of samples analysed	: 5		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA
Tyrone Cole	Inorganics Preparation Supervisor	Perth Inorganics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1707462)									
ES1816333-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.010	0.012	13.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
ES1816445-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.028	0.028	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	3.43	3.41	0.448	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.503	0.494	1.68	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.694	0.694	0.00	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.30	0.31	0.00	0% - 20%
EG020A-F: Iron	7439-89-6	0.05	mg/L	2.24	2.22	1.13	0% - 20%		
EG020T: Total Metals by ICP-MS (QC Lot: 1707517)									
EP1806724-001	BLNS-B1_31_05_18	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.018	0.019	0.00	0% - 50%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1707517) - continued									
EP1806724-001	BLNS-B1_31_05_18	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.05	0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.15	0.16	0.00	No Limit
ES1816233-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.044	0.043	3.56	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.010	0.010	0.00	0% - 50%
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.020	0.018	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.04	0.05	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	0.15	0.15	0.00	No Limit
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1707820)									
EP1806724-001	BLNS-B1_31_05_18	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1707847)									
EP1806724-001	BLNS-B1_31_05_18	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1692912)									
EP1806717-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EP1806722-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.31	0.30	0.00	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1692899)									
EP1806730-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.07	0.07	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1692913)									
EP1806717-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.83	4.79	0.707	0% - 20%
EP1806722-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1704612)									
EP1806719-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.00	No Limit
EP1806738-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.3	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1704611)									
EP1806719-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1806738-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.06	17.7	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1692898)									
EP1806730-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.09	0.09	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1693851)									
EP1806717-003	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP1806718-001	Anonymous	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1701663)									

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 Work Order : EP1806724
 Client : MRIA
 Project : MRIA - R8 Rehab



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1701663) - continued										
EP1806687-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1806687-013	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	20	20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1693851)										
EP1806717-003	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP1806718-001	Anonymous	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1701663)										
EP1806687-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1806687-013	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1701663)										
EP1806687-001	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1806687-013	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			
	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.4	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.3	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.7	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.9	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.1	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.7	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.6	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.9	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.8	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.0	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1707517)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	100	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.1	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.2	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.0	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.1	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.9	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	97.9	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1707820)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	129	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1707847)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	136	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1692912)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1692899)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1692913)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1704612)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.8	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1704611)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	105	87	115	
EP008: Chlorophyll (QCLot: 1707712)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	104	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1693851)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	73.9	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	85.4	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	380 µg/L	74.5	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1701663)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	86.3	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1693851)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	398 µg/L	75.8	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	77.3	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	86.2	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1701663)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	86.6	74	115	
EP080: BTEXN (QCLot: 1701663)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	92.8	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	87.0	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	86.2	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	84.7	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	88.9	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	77.2	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462)								
EP1806724-001	BLNS-B1_31_05_18	EG020A-F: Arsenic	7440-38-2	1 mg/L	100	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	94.7	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.4	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	97.7	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	90.7	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.2	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462) - continued							
EP1806724-001	BLNS-B1_31_05_18	EG020A-F: Nickel	7440-02-0	1 mg/L	97.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	98.0	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1707517)							
EP1806724-002	A2_31_05_18	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	99.9	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	97.9	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	94.7	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	99.9	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	102	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1692912)							
EP1806717-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	113	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1692899)							
EP1806722-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1692913)							
EP1806717-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1704612)							
EP1806719-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	93.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1704611)							
EP1806719-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	105	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898)							
EP1806722-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1693851)							
EP1806717-003	Anonymous	EP071: C10 - C14 Fraction	----	385 µg/L	79.7	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	91.0	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	75.0	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1701663)							
EP1806687-002	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	108	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1693851)							
EP1806717-003	Anonymous	EP071: >C10 - C16 Fraction	----	380 µg/L	85.1	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	81.8	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	89.4	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1701663)							
EP1806687-002	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	119	77	137
EP080: BTEXN (QCLot: 1701663)							
EP1806687-002	Anonymous	EP080: Benzene	71-43-2	20 µg/L	82.2	77	122
		EP080: Toluene	108-88-3	20 µg/L	112	74	126



QUALITY CONTROL REPORT

Work Order	: EP1806777	Page	: 1 of 5
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MDC	Date Samples Received	: 01-Jun-2018
Order number	: W81020-103	Date Analysis Commenced	: 06-Jun-2018
C-O-C number	: ----	Issue Date	: 08-Jun-2018
Sampler	: LF		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 1		
No. of samples analysed	: 1		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EA005P: pH by PC Titrator (QC Lot: 1709308)									
EP1806803-002	Anonymous	EA005-P: pH Value	----	0.01	pH Unit	8.61	8.71	1.15	0% - 20%
EP1806777-001	PB-East	EA005-P: pH Value	----	0.01	pH Unit	6.64	6.63	0.151	0% - 20%
EA010P: Conductivity by PC Titrator (QC Lot: 1709309)									
EP1806777-001	PB-East	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	219	215	1.86	0% - 20%
EP1806876-002	Anonymous	EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	<1	0.00	No Limit
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QC Lot: 1708042)									
EP1806791-001	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	89000	90600	1.72	0% - 20%
EP1806753-006	Anonymous	EA015H: Total Dissolved Solids @180°C	----	10	mg/L	1020	997	1.79	0% - 20%
ED037P: Alkalinity by PC Titrator (QC Lot: 1709304)									
EP1806763-007	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	108	116	7.18	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	108	116	7.18	0% - 20%
EP1806763-009	Anonymous	ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-001	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	<1	0.00	No Limit
		ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	273	265	3.17	0% - 20%
		ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	273	265	3.17	0% - 20%
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QC Lot: 1706278)									
EP1806777-001	PB-East	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	15	14	0.00	0% - 50%
EP1806812-010	Anonymous	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	78	78	0.00	0% - 20%
ED045G: Chloride by Discrete Analyser (QC Lot: 1706279)									
EP1806777-001	PB-East	ED045G: Chloride	16887-00-6	1	mg/L	38	36	3.60	0% - 20%
EP1806812-010	Anonymous	ED045G: Chloride	16887-00-6	1	mg/L	201	200	0.582	0% - 20%
ED093F: Dissolved Major Cations (QC Lot: 1704229)									



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
ED093F: Dissolved Major Cations (QC Lot: 1704229) - continued									
EP1806752-001	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	125	136	8.30	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	139	151	8.10	0% - 20%
		ED093F: Sodium	7440-23-5	1	mg/L	2060	2250	8.93	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	67	74	10.2	0% - 20%
EP1806782-009	Anonymous	ED093F: Calcium	7440-70-2	1	mg/L	27	26	4.78	0% - 20%
		ED093F: Magnesium	7439-95-4	1	mg/L	8	7	0.00	No Limit
		ED093F: Sodium	7440-23-5	1	mg/L	78	74	5.86	0% - 20%
		ED093F: Potassium	7440-09-7	1	mg/L	6	6	0.00	No Limit
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1707462)									
ES1816333-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.002	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	0.002	0.002	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.010	0.012	13.0	0% - 50%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1816445-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.028	0.028	0.00	0% - 20%
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	3.43	3.41	0.448	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.503	0.494	1.68	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.694	0.694	0.00	0% - 20%
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.30	0.31	0.00	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	2.24	2.22	1.13	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1707820)									
EP1806724-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EA005P: pH by PC Titrator (QCLot: 1709308)									
EA005-P: pH Value	----	----	pH Unit	----	4 pH Unit	100	99	102	
				----	7 pH Unit	99.8	99	102	
EA010P: Conductivity by PC Titrator (QCLot: 1709309)									
EA010-P: Electrical Conductivity @ 25°C	----	1	µS/cm	<1	24800 µS/cm	97.4	95	105	
EA015: Total Dissolved Solids dried at 180 ± 5 °C (QCLot: 1708042)									
EA015H: Total Dissolved Solids @180°C	----	10	mg/L	<10	2000 mg/L	106	83	111	
				<10	1000 mg/L	108	70	130	
ED037P: Alkalinity by PC Titrator (QCLot: 1709304)									
ED037-P: Hydroxide Alkalinity as CaCO3	DMO-210-00 1	1	mg/L	<1	----	----	----	----	
ED037-P: Carbonate Alkalinity as CaCO3	3812-32-6	1	mg/L	<1	----	----	----	----	
ED037-P: Bicarbonate Alkalinity as CaCO3	71-52-3	1	mg/L	<1	----	----	----	----	
ED037-P: Total Alkalinity as CaCO3	----	1	mg/L	<1	20 mg/L	116	76	126	
				<1	200 mg/L	101	90	106	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1706278)									
ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	1	mg/L	<1	25 mg/L	107	89	113	
				<1	100 mg/L	99.6	79	121	
ED045G: Chloride by Discrete Analyser (QCLot: 1706279)									
ED045G: Chloride	16887-00-6	1	mg/L	<1	10 mg/L	98.7	84	120	
				<1	1000 mg/L	104	84	110	
ED093F: Dissolved Major Cations (QCLot: 1704229)									
ED093F: Calcium	7440-70-2	1	mg/L	<1	50 mg/L	98.2	91	109	
ED093F: Magnesium	7439-95-4	1	mg/L	<1	50 mg/L	101	90	108	
ED093F: Sodium	7440-23-5	1	mg/L	<1	50 mg/L	108	87	111	
ED093F: Potassium	7440-09-7	1	mg/L	<1	50 mg/L	96.2	90	110	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	98.4	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.3	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	90.7	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	92.9	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.1	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	90.7	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	92.6	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	86.9	82	112	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462) - continued								
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	95.8	81	117
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	93.0	82	112
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1707820)								
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	129	74	130

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery (%) MS	Recovery Limits (%)	
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA (QCLot: 1706278)							
EP1806777-001	PB-East	ED041G: Sulfate as SO4 - Turbidimetric	14808-79-8	100 mg/L	101	70	130
ED045G: Chloride by Discrete Analyser (QCLot: 1706279)							
EP1806777-001	PB-East	ED045G: Chloride	16887-00-6	1000 mg/L	104	70	130
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707462)							
EP1806724-001	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	100	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	94.7	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	94.4	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	97.7	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	90.7	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	90.2	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	97.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	98.0	70	130

QUALITY CONTROL REPORT

Work Order	: EP1806776	Page	: 1 of 8
Amendment	: 1		
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: 60478410	Date Samples Received	: 01-Jun-2018
Order number	: W81020-103	Date Analysis Commenced	: 01-Jun-2018
C-O-C number	: ----	Issue Date	: 12-Jun-2018
Sampler	: Tim Williamson		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 13		
No. of samples analysed	: 13		



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Accredited for compliance with
ISO/IEC 17025 - Testing

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- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Efua Wilson	Metals Chemist	Perth Inorganics, Wangara, WA
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

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 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

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Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1707772)									
EP1806773-004	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0020	<0.0020	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.029	0.029	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.020	<0.020	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	2.10	1.99	5.07	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	6.67	6.49	2.74	0% - 20%
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.100	<0.100	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.20	<0.20	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.20	<0.20	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<1.00	<1.00	0.00	No Limit
EP1806776-010	WQA01_01_06_18	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.007	0.006	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.32	0.32	0.00	0% - 20%
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.48	0.48	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1707796)									
EP1806889-006	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1707796) - continued									
EP1806889-006	Anonymous	EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	1.18	1.19	0.858	0% - 20%
		EG020A-T: Lead	7439-92-1	0.001	mg/L	0.102	0.101	0.00	0% - 20%
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.007	0.008	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	1.72	1.72	0.418	0% - 20%
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EP1806683-001	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit		
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit		
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1696231)									
EP1806774-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.04	0.04	0.00	No Limit
EP1806776-008	BH12_01_06_18	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1696217)									
EP1806776-002	GW-D4_01_06_18	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1806778-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.01	0.02	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1696232)									
EP1806774-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.06	0.06	0.00	No Limit
EP1806776-008	BH12_01_06_18	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	3.22	3.25	0.989	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1708618)									
EP1806708-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EP1806737-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	1.4	1.3	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1708620)									
EP1806776-002	GW-D4_01_06_18	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.6	0.6	0.00	No Limit
EP1806803-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	9.2	9.3	1.71	0% - 20%
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1708617)									
EP1806708-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.01	0.02	0.00	No Limit
EP1806737-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.06	0.07	15.2	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1708619)									



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1708619) - continued										
EP1806776-002	GW-D4_01_06_18	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.02	0.03	0.00	No Limit	
EP1806803-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	2.91	2.92	0.00	0% - 20%	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1696216)										
EP1806776-002	GW-D4_01_06_18	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP1806778-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1708258)										
EP1806776-001	GW-D3_01_06_18	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1806776-011	WQA03_01_06_18	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1708258)										
EP1806776-001	GW-D3_01_06_18	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1806776-011	WQA03_01_06_18	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1708258)										
EP1806776-001	GW-D3_01_06_18	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1806776-011	WQA03_01_06_18	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit			



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707772)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	91.8	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	101	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	93.7	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.7	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	95.0	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	95.2	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	96.6	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	104	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.0	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	101	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	84	120	
EG020T: Total Metals by ICP-MS (QCLot: 1707796)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	92.4	84	120	
EG020A-T: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	93.0	85	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.7	84	120	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	90.4	85	120	
EG020A-T: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.1	83	120	
EG020A-T: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	91.7	86	120	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	94.3	85	120	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	91.1	83	120	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	97.5	83	120	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	98.7	84	120	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	103	77	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1696231)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	103	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1696217)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	107	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1696232)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	107	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1708618)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	83.3	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1708620)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	87.2	82	110	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report			
					Spike Concentration	Spike Recovery (%)	Recovery Limits (%)	
						LCS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1708617)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	84.8	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1708619)								
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.0	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1696216)								
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	109	87	115
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1700906)								
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	76.2	35	95
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	102	34	111
EP071: C29 - C36 Fraction	----	50	µg/L	<50	380 µg/L	104	34	105
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1708258)								
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	104	74	113
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1700906)								
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	398 µg/L	86.5	37	99
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	105	35	108
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	109	11	117
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1708258)								
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	107	74	115
EP080: BTEXN (QCLot: 1708258)								
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	110	84	114
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	95.8	81	115
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	88.2	84	113
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	102	84	114
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	108	87	111
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	82.2	77	118

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%)	Recovery Limits (%)	
					MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707772)							
EP1806776-001	GW-D3_01_06_18	EG020A-F: Arsenic	7440-38-2	0.4 mg/L	97.7	70	130
		EG020A-F: Cadmium	7440-43-9	0.1 mg/L	93.2	70	130
		EG020A-F: Chromium	7440-47-3	0.4 mg/L	91.2	70	130



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike	SpikeRecovery(%)	Recovery Limits (%)	
				Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1707772) - continued							
EP1806776-001	GW-D3_01_06_18	EG020A-F: Copper	7440-50-8	0.4 mg/L	93.7	70	130
		EG020A-F: Lead	7439-92-1	0.4 mg/L	91.3	70	130
		EG020A-F: Manganese	7439-96-5	0.4 mg/L	95.2	70	130
		EG020A-F: Nickel	7440-02-0	0.4 mg/L	94.6	70	130
		EG020A-F: Zinc	7440-66-6	0.4 mg/L	100	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1707796)							
EP1806683-002	Anonymous	EG020A-T: Arsenic	7440-38-2	1 mg/L	94.8	70	130
		EG020A-T: Cadmium	7440-43-9	0.25 mg/L	94.7	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	93.7	70	130
		EG020A-T: Copper	7440-50-8	1 mg/L	92.7	70	130
		EG020A-T: Lead	7439-92-1	1 mg/L	101	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	95.9	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	94.6	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	96.2	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1696231)							
EP1806771-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	105	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1696217)							
EP1806776-001	GW-D3_01_06_18	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1696232)							
EP1806771-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	113	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1708618)							
EP1806708-004	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	82.9	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1708620)							
EP1806803-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	116	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1708617)							
EP1806708-004	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	91.0	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1708619)							
EP1806803-002	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	79.3	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1696216)							
EP1806776-001	GW-D3_01_06_18	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	108	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1700906)							
EP1806776-001	GW-D3_01_06_18	EP071: C10 - C14 Fraction	----	385 µg/L	61.4	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	74.5	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	81.6	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1708258)							



Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1708258) - continued							
EP1806776-002	GW-D4_01_06_18	EP080: C6 - C9 Fraction	----	240 µg/L	93.6	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1700906)							
EP1806776-001	GW-D3_01_06_18	EP071: >C10 - C16 Fraction	----	380 µg/L	66.1	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	78.6	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	83.6	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1708258)							
EP1806776-002	GW-D4_01_06_18	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	99.5	77	137
EP080: BTEXN (QCLot: 1708258)							
EP1806776-002	GW-D4_01_06_18	EP080: Benzene	71-43-2	20 µg/L	106	77	122
		EP080: Toluene	108-88-3	20 µg/L	89.7	74	126

QUALITY CONTROL REPORT

Work Order	: EP1807736	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 27-Jun-2018
Order number	: W81020-103	Date Analysis Commenced	: 27-Jun-2018
C-O-C number	: ----	Issue Date	: 04-Jul-2018
Sampler	: D. Sullivan		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 12		
No. of samples analysed	: 9		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
Canhuang Ke	Inorganics Supervisor	Perth Inorganics, Wangara, WA
Celine Conceicao	Senior Spectroscopist	Sydney Inorganics, Smithfield, NSW
Chris Lemaitre	Laboratory Manager (Perth)	Perth Inorganics, Wangara, WA
Ivan Taylor	Analyst	Sydney Inorganics, Smithfield, NSW
Santusha Pandra	Organic Supervisor	Perth Organics, Wangara, WA



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1774492)									
EP1807736-001	GW-D5_27_06_18	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.54	0.54	1.95	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.14	<0.05	97.2	No Limit
EP1807774-003	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.14	0.14	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1774497)									
EP1807736-009	WQA03_27_06_18	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit

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 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1774497) - continued									
EP1807736-009	WQA03_27_06_18	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1819442-008	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.048	0.049	2.20	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	61.8	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.017	0.015	7.80	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	7.83	8.51	8.35	0% - 20%
		EG020A-T: Iron	7439-89-6	0.05	mg/L	5.66	5.89	4.12	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1774822)									
EP1807736-001	GW-D5_27_06_18	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EP1807774-003	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1774855)									
EP1807736-009	WQA03_27_06_18	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1760105)									
EP1807691-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.16	0.17	0.00	0% - 50%
EP1807736-001	GW-D5_27_06_18	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.10	0.09	0.00	No Limit
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1760108)									
EP1807736-002	T3B_27_06_18	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.01	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1760104)									
EP1807691-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.75	0.75	0.00	0% - 20%
EP1807736-001	GW-D5_27_06_18	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1772082)									
EP1807734-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.4	0.00	No Limit
EP1807758-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1772083)									
EP1807734-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.04	0.03	26.6	No Limit
EP1807758-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1760107)									
EP1807736-002	T3B_27_06_18	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1764586)									
EP1807736-001	GW-D5_27_06_18	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1764586)									
EP1807736-001	GW-D5_27_06_18	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1764586)									
EP1807736-001	GW-D5_27_06_18	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit

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 Client : MRIA
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Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EP080: BTEXN (QC Lot: 1764586) - continued									
EP1807736-001	GW-D5_27_06_18	EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1774492)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	90.9	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.5	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.5	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.3	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.8	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.9	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.9	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.4	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.2	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	89.3	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1774497)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.8	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.0	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.6	84	116	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.2	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.6	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1774822)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	109	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1774855)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	103	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1760105)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1760108)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	103	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1760104)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	96.6	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772082)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	84.0	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772083)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	90.2	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1760107)									



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1760107) - continued									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	105	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1760967)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	51.2	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	68.9	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	380 µg/L	63.0	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1764586)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	90.6	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1760967)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	398 µg/L	55.0	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	66.6	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	47.0	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1764586)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	86.4	74	115	
EP080: BTEXN (QCLot: 1764586)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	90.5	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	98.1	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	95.0	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	99.3	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	101	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	93.6	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report				
				Spike Concentration	Spike Recovery(%)		Recovery Limits (%)	
					MS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1774492)								
EP1807736-002	T3B_27_06_18	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.3	70	130	
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	90.6	70	130	
		EG020A-F: Chromium	7440-47-3	1 mg/L	92.5	70	130	
		EG020A-F: Copper	7440-50-8	1 mg/L	89.2	70	130	
		EG020A-F: Lead	7439-92-1	1 mg/L	96.8	70	130	
		EG020A-F: Manganese	7439-96-5	1 mg/L	89.7	70	130	
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.0	70	130	
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.1	70	130	



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020T: Total Metals by ICP-MS (QCLot: 1774497)							
EP1807774-006	Anonymous	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	104	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	105	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	104	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	107	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	107	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1760105)							
EP1807691-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	102	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1760108)							
EP1807736-001	GW-D5_27_06_18	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	109	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1760104)							
EP1807691-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772082)							
EP1807734-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	87.4	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772083)							
EP1807734-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	95.6	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1760107)							
EP1807736-001	GW-D5_27_06_18	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	107	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1764586)							
EP1807736-002	T3B_27_06_18	EP080: C6 - C9 Fraction	----	240 µg/L	87.1	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1764586)							
EP1807736-002	T3B_27_06_18	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	90.0	77	137
EP080: BTEXN (QCLot: 1764586)							
EP1807736-002	T3B_27_06_18	EP080: Benzene	71-43-2	20 µg/L	78.4	77	122
		EP080: Toluene	108-88-3	20 µg/L	78.4	74	126

QUALITY CONTROL REPORT

Work Order	: EP1807774	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Contact	: Brandon Ovens
Address	: 202 Pier Street Perth, Western Australia 6000	Address	: 26 Rigali Way Wangara WA Australia 6065
Telephone	: ----	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 28-Jun-2018
Order number	: W81020-103	Date Analysis Commenced	: 28-Jun-2018
C-O-C number	: ----	Issue Date	: 05-Jul-2018
Sampler	: D Sullivan		
Site	: ----		
Quote number	: EP/840/17		
No. of samples received	: 10		
No. of samples analysed	: 10		



This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
- Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
- Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

<i>Signatories</i>	<i>Position</i>	<i>Accreditation Category</i>
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General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

- Key :
- Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 - CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 - LOR = Limit of reporting
 - RPD = Relative Percentage Difference
 - # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1774492)									
EP1807736-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.54	0.54	1.95	0% - 20%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.14	<0.05	97.2	No Limit
EP1807774-003	GW-D8_28_06_18	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.14	0.14	0.00	0% - 50%
		EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1771440)									
EP1807728-005	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit



Sub-Matrix: WATER				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020T: Total Metals by ICP-MS (QC Lot: 1771440) - continued									
EP1807728-005	Anonymous	EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	0.01	0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
EG020T: Total Metals by ICP-MS (QC Lot: 1774497)									
EP1807736-009	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	<0.05	0.00	No Limit
ES1819442-008	Anonymous	EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-T: Chromium	7440-47-3	0.001	mg/L	0.005	0.006	0.00	No Limit
		EG020A-T: Manganese	7439-96-5	0.001	mg/L	0.048	0.049	2.20	0% - 20%
		EG020A-T: Nickel	7440-02-0	0.001	mg/L	0.001	0.002	61.8	No Limit
		EG020A-T: Zinc	7440-66-6	0.005	mg/L	0.017	0.015	7.80	No Limit
		EG020A-T: Aluminium	7429-90-5	0.01	mg/L	7.83	8.51	8.35	0% - 20%
		EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-T: Iron	7439-89-6	0.05	mg/L	5.66	5.89	4.12	0% - 20%
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QC Lot: 1774822)									
EP1807736-001	Anonymous	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EP1807774-003	GW-D8_28_06_18	EG093B-F: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EG093T: Total Metals in Saline Water by ORC-ICPMS (QC Lot: 1774855)									
EP1807736-009	Anonymous	EG093B-T: Selenium	7782-49-2	2	µg/L	<2	<2	0.00	No Limit
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1763620)									
EP1807774-002	GW-D4_28_06_18	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EP1807776-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	1.85	1.86	0.753	0% - 20%
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1763613)									
EP1807776-003	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	<0.01	0.00	No Limit
EP1807776-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.15	0.15	0.00	0% - 50%
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1763621)									
EP1807774-002	GW-D4_28_06_18	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.20	0.20	0.00	0% - 20%
EP1807776-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	1.93	1.89	2.10	0% - 20%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1772517)									
EP1807761-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	250	258	3.45	0% - 20%
EP1807770-009	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.2	0.2	0.00	No Limit
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1772520)									

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 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1772520) - continued										
EP1807774-008	A2S_28_06_18	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	2.4	2.4	0.00	0% - 20%	
EP1807799-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	7.6	7.6	0.00	0% - 50%	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1772518)										
EP1807761-002	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	51.0	49.9	2.11	0% - 20%	
EP1807770-009	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.01	0.00	No Limit	
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1772519)										
EP1807774-008	A2S_28_06_18	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.10	0.09	0.00	No Limit	
EP1807799-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	3.59	3.33	7.37	0% - 20%	
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1763612)										
EP1807776-003	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.03	0.03	0.00	No Limit	
EP1807776-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.02	<0.02	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1764410)										
EP1807774-001	GW-D3_28_06_18	EP071: C15 - C28 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: C10 - C14 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
		EP071: C29 - C36 Fraction	----	50	µg/L	<50	<50	0.00	No Limit	
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1771878)										
EP1807774-001	GW-D3_28_06_18	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP1807797-001	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1764410)										
EP1807774-001	GW-D3_28_06_18	EP071: >C10 - C16 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C16 - C34 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
		EP071: >C34 - C40 Fraction	----	100	µg/L	<100	<100	0.00	No Limit	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1771878)										
EP1807774-001	GW-D3_28_06_18	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP1807797-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit	
EP080: BTEXN (QC Lot: 1771878)										
EP1807774-001	GW-D3_28_06_18	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit	
EP1807797-001	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit	
		EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit	
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit	
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit	
		EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	<2	0.00	No Limit	
			106-42-3							
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit			

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 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: **WATER**

				<i>Laboratory Duplicate (DUP) Report</i>					
<i>Laboratory sample ID</i>	<i>Client sample ID</i>	<i>Method: Compound</i>	<i>CAS Number</i>	<i>LOR</i>	<i>Unit</i>	<i>Original Result</i>	<i>Duplicate Result</i>	<i>RPD (%)</i>	<i>Recovery Limits (%)</i>
EP080: BTEXN (QC Lot: 1771878) - continued									
EP1807797-001	Anonymous	EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1774492)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	90.9	80	116	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	91.5	85	114	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	89.5	84	110	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	89.3	85	111	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	90.8	81	111	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	88.9	83	111	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	88.9	82	110	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	90.4	82	112	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	91.2	81	117	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	89.3	82	112	
EG020T: Total Metals by ICP-MS (QCLot: 1771440)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	101	84	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	107	84	120	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	103	85	120	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	120	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	101	83	120	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	111	83	120	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	114	84	120	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	107	77	120	
EG020T: Total Metals by ICP-MS (QCLot: 1774497)									
EG020A-T: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	102	82	120	
EG020A-T: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	97.8	84	112	
EG020A-T: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	97.0	86	116	
EG020A-T: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	104	85	113	
EG020A-T: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	94.6	84	116	
EG020A-T: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	92.8	68	126	
EG020A-T: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	96.2	79	117	
EG020A-T: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	95.6	85	117	
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS (QCLot: 1774822)									
EG093B-F: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	109	74	130	
EG093T: Total Metals in Saline Water by ORC-ICPMS (QCLot: 1774855)									
EG093B-T: Selenium	7782-49-2	2	µg/L	<2	10 µg/L	103	80	138	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1763620)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	105	87	115	



Sub-Matrix: WATER

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1763613)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	102	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1763621)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	99.0	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772517)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	95.4	82	110	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772520)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	91.6	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772518)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.0	70	130	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772519)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	94.6	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1763612)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	105	87	115	
EP008: Chlorophyll (QCLot: 1768061)									
EP008: Chlorophyll a	----	1	mg/m ³	<1	20 mg/m ³	124	70	130	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1764410)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	63.6	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	77.9	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	380 µg/L	91.0	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1771878)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	99.2	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1764410)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	398 µg/L	66.4	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	81.5	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	91.7	11	117	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1771878)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	97.6	74	115	
EP080: BTEXN (QCLot: 1771878)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	103	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	104	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	104	84	113	
EP080: meta- & para-Xylene	108-38-3	2	µg/L	<2	40 µg/L	103	84	114	
	106-42-3								
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	102	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	104	77	118	



Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EG020F: Dissolved Metals by ICP-MS (QCLot: 1774492)							
EP1807736-002	Anonymous	EG020A-F: Arsenic	7440-38-2	1 mg/L	89.3	70	130
		EG020A-F: Cadmium	7440-43-9	0.25 mg/L	90.6	70	130
		EG020A-F: Chromium	7440-47-3	1 mg/L	92.5	70	130
		EG020A-F: Copper	7440-50-8	1 mg/L	89.2	70	130
		EG020A-F: Lead	7439-92-1	1 mg/L	96.8	70	130
		EG020A-F: Manganese	7439-96-5	1 mg/L	89.7	70	130
		EG020A-F: Nickel	7440-02-0	1 mg/L	90.0	70	130
		EG020A-F: Zinc	7440-66-6	1 mg/L	90.1	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1771440)							
EP1807774-010	WQA03_28_06_18	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	108	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	94.7	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	103	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	98.2	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	104	70	130
EG020T: Total Metals by ICP-MS (QCLot: 1774497)							
EP1807774-006	BLNS-B1_28_06_18	EG020A-T: Cadmium	7440-43-9	0.25 mg/L	104	70	130
		EG020A-T: Chromium	7440-47-3	1 mg/L	105	70	130
		EG020A-T: Manganese	7439-96-5	1 mg/L	104	70	130
		EG020A-T: Nickel	7440-02-0	1 mg/L	107	70	130
		EG020A-T: Zinc	7440-66-6	1 mg/L	107	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1763620)							
EP1807774-001	GW-D3_28_06_18	EK055G: Ammonia as N	7664-41-7	1 mg/L	109	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1763613)							
EP1807774-001	GW-D3_28_06_18	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	103	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1763621)							
EP1807774-001	GW-D3_28_06_18	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	98.8	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772517)							
EP1807761-002	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	25 mg/L	# Not Determined	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1772520)							
EP1807774-008	A2S_28_06_18	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	85.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772518)							
EP1807761-002	Anonymous						

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 Work Order : EP1807774
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772518) - continued							
EP1807761-002	Anonymous	EK067G: Total Phosphorus as P	----	5 mg/L	# Not Determined	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1772519)							
EP1807774-008	A2S_28_06_18	EK067G: Total Phosphorus as P	----	1 mg/L	95.6	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1763612)							
EP1807774-001	GW-D3_28_06_18	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	107	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1764410)							
EP1807774-007	A2_28_06_18	EP071: C10 - C14 Fraction	----	385 µg/L	65.9	45	122
		EP071: C15 - C28 Fraction	----	385 µg/L	72.8	55	143
		EP071: C29 - C36 Fraction	----	398 µg/L	77.2	54	128
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1771878)							
EP1807774-002	GW-D4_28_06_18	EP080: C6 - C9 Fraction	----	240 µg/L	96.1	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1764410)							
EP1807774-007	A2_28_06_18	EP071: >C10 - C16 Fraction	----	380 µg/L	70.4	45	122
		EP071: >C16 - C34 Fraction	----	597 µg/L	73.8	55	143
		EP071: >C34 - C40 Fraction	----	168 µg/L	83.0	54	128
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1771878)							
EP1807774-002	GW-D4_28_06_18	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	95.3	77	137
EP080: BTEXN (QCLot: 1771878)							
EP1807774-002	GW-D4_28_06_18	EP080: Benzene	71-43-2	20 µg/L	104	77	122
		EP080: Toluene	108-88-3	20 µg/L	95.5	74	126



QUALITY CONTROL REPORT

Work Order : EP1806725
Amendment : 1

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Client : MRIA
Contact : Chris McGraghan
Address : 202 Pier Street
Perth, Western Australia 6000
Telephone : ----
Project : 60478410
Order number : W81020-103
C-O-C number : ----
Sampler : Tim Williamson
Site : ----
Quote number : EP/840/17
No. of samples received : 2
No. of samples analysed : 2

Laboratory : Environmental Division Perth
Contact : Brandon Ovens
Address : 26 Rigali Way Wangara WA Australia 6065
Telephone : 08 9406 1328
Date Samples Received : 31-May-2018
Date Analysis Commenced : 31-May-2018
Issue Date : 13-Jun-2018



Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percentage Difference (RPD) and Acceptance Limits
Method Blank (MB) and Laboratory Control Spike (LCS) Report; Recovery and Acceptance Limits
Matrix Spike (MS) Report; Recovery and Acceptance Limits

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

Table with 3 columns: Signatories, Position, Accreditation Category. Rows include Canhuang Ke, Chris Lemaitre, and Santusha Pandra.



General Comments

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis. Where the LOR of a reported result differs from standard LOR, this may be due to high

Key :
 Anonymous = Refers to samples which are not specifically part of this work order but formed part of the QC process lot
 CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
 LOR = Limit of reporting
 RPD = Relative Percentage Difference
 # = Indicates failed QC

Laboratory Duplicate (DUP) Report

The quality control term Laboratory Duplicate refers to a randomly selected intralaboratory split. Laboratory duplicates provide information regarding method precision and sample heterogeneity. The permitted ranges for the Relative Percent Deviation (RPD) of Laboratory Duplicates are specified in ALS Method QWI-EN/38 and are dependent on the magnitude of results in comparison to the level of reporting: Result < 10 times LOR: No Limit; Result between 10 and 20 times LOR: 0% - 50%; Result > 20 times LOR: 0% - 20%.

Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EG020F: Dissolved Metals by ICP-MS (QC Lot: 1704220)									
EP1806700-001	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.049	0.049	0.00	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	<0.005	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.04	0.04	0.00	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	0.42	0.42	0.00	No Limit
EP1806716-005	Anonymous	EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	<0.0001	0.00	No Limit
		EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	<0.001	0.00	No Limit
		EG020A-F: Copper	7440-50-8	0.001	mg/L	0.004	0.004	0.00	No Limit
		EG020A-F: Lead	7439-92-1	0.001	mg/L	0.001	0.001	0.00	No Limit
		EG020A-F: Manganese	7439-96-5	0.001	mg/L	0.135	0.137	1.84	0% - 20%
		EG020A-F: Nickel	7440-02-0	0.001	mg/L	0.003	0.003	0.00	No Limit
		EG020A-F: Zinc	7440-66-6	0.005	mg/L	0.014	0.014	0.00	No Limit
		EG020A-F: Aluminium	7429-90-5	0.01	mg/L	0.06	0.08	34.6	No Limit
		EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	<0.01	0.00	No Limit
		EG020A-F: Iron	7439-89-6	0.05	mg/L	7.64	7.53	1.46	0% - 20%
EK055G: Ammonia as N by Discrete Analyser (QC Lot: 1692912)									
EP1806717-002	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.02	0.02	0.00	No Limit
EP1806722-001	Anonymous	EK055G: Ammonia as N	7664-41-7	0.01	mg/L	0.31	0.30	0.00	0% - 20%



Sub-Matrix: **WATER**

				Laboratory Duplicate (DUP) Report					
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)	Recovery Limits (%)
EK057G: Nitrite as N by Discrete Analyser (QC Lot: 1692899)									
EP1806730-002	Anonymous	EK057G: Nitrite as N	14797-65-0	0.01	mg/L	0.07	0.07	0.00	No Limit
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QC Lot: 1692913)									
EP1806717-002	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	4.83	4.79	0.707	0% - 20%
EP1806722-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	0.11	0.11	0.00	0% - 50%
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QC Lot: 1704612)									
EP1806719-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.5	0.5	0.00	No Limit
EP1806738-001	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	0.4	0.3	0.00	No Limit
EK067G: Total Phosphorus as P by Discrete Analyser (QC Lot: 1704611)									
EP1806719-003	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.03	0.03	0.00	No Limit
EP1806738-001	Anonymous	EK067G: Total Phosphorus as P	----	0.01	mg/L	0.08	0.06	17.7	No Limit
EK071G: Reactive Phosphorus as P by discrete analyser (QC Lot: 1692898)									
EP1806730-002	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	0.09	0.09	0.00	No Limit
EP080/071: Total Petroleum Hydrocarbons (QC Lot: 1704359)									
EP1806700-007	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP1806774-008	Anonymous	EP080: C6 - C9 Fraction	----	20	µg/L	<20	<20	0.00	No Limit
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QC Lot: 1704359)									
EP1806700-007	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP1806774-008	Anonymous	EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	<20	0.00	No Limit
EP080: BTEXN (QC Lot: 1704359)									
EP1806700-007	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit
EP1806774-008	Anonymous	EP080: Benzene	71-43-2	1	µg/L	<1	<1	0.00	No Limit
		EP080: Toluene	108-88-3	2	µg/L	<2	<2	0.00	No Limit
		EP080: Ethylbenzene	100-41-4	2	µg/L	<2	<2	0.00	No Limit
		EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	3	2	39.7	No Limit
		EP080: ortho-Xylene	95-47-6	2	µg/L	<2	<2	0.00	No Limit
		EP080: Naphthalene	91-20-3	5	µg/L	<5	<5	0.00	No Limit



Method Blank (MB) and Laboratory Control Spike (LCS) Report

The quality control term Method / Laboratory Blank refers to an analyte free matrix to which all reagents are added in the same volumes or proportions as used in standard sample preparation. The purpose of this QC parameter is to monitor potential laboratory contamination. The quality control term Laboratory Control Spike (LCS) refers to a certified reference material, or a known interference free matrix spiked with target analytes. The purpose of this QC parameter is to monitor method precision and accuracy independent of sample matrix. Dynamic Recovery Limits are based on statistical evaluation of processed LCS.

Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report	Laboratory Control Spike (LCS) Report				
				Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EG020F: Dissolved Metals by ICP-MS (QCLot: 1704220)									
EG020A-F: Aluminium	7429-90-5	0.01	mg/L	<0.01	0.5 mg/L	93.6	84	120	
EG020A-F: Arsenic	7440-38-2	0.001	mg/L	<0.001	0.1 mg/L	98.0	84	120	
EG020A-F: Cadmium	7440-43-9	0.0001	mg/L	<0.0001	0.1 mg/L	95.0	86	120	
EG020A-F: Chromium	7440-47-3	0.001	mg/L	<0.001	0.1 mg/L	94.8	85	120	
EG020A-F: Copper	7440-50-8	0.001	mg/L	<0.001	0.1 mg/L	91.4	84	120	
EG020A-F: Lead	7439-92-1	0.001	mg/L	<0.001	0.1 mg/L	94.0	85	120	
EG020A-F: Manganese	7439-96-5	0.001	mg/L	<0.001	0.1 mg/L	100	85	120	
EG020A-F: Nickel	7440-02-0	0.001	mg/L	<0.001	0.1 mg/L	96.9	84	120	
EG020A-F: Selenium	7782-49-2	0.01	mg/L	<0.01	0.1 mg/L	95.8	88	120	
EG020A-F: Zinc	7440-66-6	0.005	mg/L	<0.005	0.1 mg/L	108	89	120	
EG020A-F: Iron	7439-89-6	0.05	mg/L	<0.05	0.5 mg/L	102	84	120	
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1692912)									
EK055G: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	1 mg/L	104	87	115	
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1692899)									
EK057G: Nitrite as N	14797-65-0	0.01	mg/L	<0.01	0.5 mg/L	104	86	112	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1692913)									
EK059G: Nitrite + Nitrate as N	----	0.01	mg/L	<0.01	0.5 mg/L	100	92	112	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1704612)									
EK061G: Total Kjeldahl Nitrogen as N	----	0.1	mg/L	<0.1	10 mg/L	92.8	82	110	
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1704611)									
EK067G: Total Phosphorus as P	----	0.01	mg/L	<0.01	4.42 mg/L	89.1	70	130	
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898)									
EK071G: Reactive Phosphorus as P	14265-44-2	0.01	mg/L	<0.01	0.5 mg/L	105	87	115	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1693852)									
EP071: C10 - C14 Fraction	----	50	µg/L	<50	385 µg/L	79.8	35	95	
EP071: C15 - C28 Fraction	----	100	µg/L	<100	385 µg/L	97.6	34	111	
EP071: C29 - C36 Fraction	----	50	µg/L	<50	380 µg/L	95.8	34	105	
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1704359)									
EP080: C6 - C9 Fraction	----	20	µg/L	<20	320 µg/L	95.5	74	113	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1693852)									
EP071: >C10 - C16 Fraction	----	100	µg/L	<100	398 µg/L	81.5	37	99	
EP071: >C16 - C34 Fraction	----	100	µg/L	<100	597 µg/L	95.0	35	108	
EP071: >C34 - C40 Fraction	----	100	µg/L	<100	168 µg/L	97.4	11	117	



Sub-Matrix: **WATER**

Method: Compound	CAS Number	LOR	Unit	Method Blank (MB) Report Result	Laboratory Control Spike (LCS) Report				
					Spike Concentration	Spike Recovery (%)		Recovery Limits (%)	
						LCS	Low	High	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1704359)									
EP080: C6 - C10 Fraction	C6_C10	20	µg/L	<20	370 µg/L	94.9	74	115	
EP080: BTEXN (QCLot: 1704359)									
EP080: Benzene	71-43-2	1	µg/L	<1	20 µg/L	102	84	114	
EP080: Toluene	108-88-3	2	µg/L	<2	20 µg/L	99.7	81	115	
EP080: Ethylbenzene	100-41-4	2	µg/L	<2	20 µg/L	96.8	84	113	
EP080: meta- & para-Xylene	108-38-3 106-42-3	2	µg/L	<2	40 µg/L	99.0	84	114	
EP080: ortho-Xylene	95-47-6	2	µg/L	<2	20 µg/L	103	87	111	
EP080: Naphthalene	91-20-3	5	µg/L	<5	20 µg/L	111	77	118	

Matrix Spike (MS) Report

The quality control term Matrix Spike (MS) refers to an intralaboratory split sample spiked with a representative set of target analytes. The purpose of this QC parameter is to monitor potential matrix effects on analyte recoveries. Static Recovery Limits as per laboratory Data Quality Objectives (DQOs). Ideal recovery ranges stated may be waived in the event of sample matrix interference.

Sub-Matrix: **WATER**

Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Matrix Spike (MS) Report			
				Spike Concentration	Spike Recovery(%) MS	Recovery Limits (%)	
				Low	High		
EG020F: Dissolved Metals by ICP-MS (QCLot: 1704220)							
EP1806700-002	Anonymous	EG020A-F: Arsenic	7440-38-2	0.3 mg/L	94.9	70	130
		EG020A-F: Cadmium	7440-43-9	0.075 mg/L	95.9	70	130
		EG020A-F: Chromium	7440-47-3	0.3 mg/L	93.0	70	130
		EG020A-F: Copper	7440-50-8	0.3 mg/L	91.7	70	130
		EG020A-F: Lead	7439-92-1	0.3 mg/L	90.9	70	130
		EG020A-F: Manganese	7439-96-5	0.3 mg/L	96.3	70	130
		EG020A-F: Nickel	7440-02-0	0.3 mg/L	93.6	70	130
		EG020A-F: Zinc	7440-66-6	0.3 mg/L	98.8	70	130
EK055G: Ammonia as N by Discrete Analyser (QCLot: 1692912)							
EP1806717-001	Anonymous	EK055G: Ammonia as N	7664-41-7	1 mg/L	113	70	130
EK057G: Nitrite as N by Discrete Analyser (QCLot: 1692899)							
EP1806722-001	Anonymous	EK057G: Nitrite as N	14797-65-0	0.5 mg/L	107	70	130
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser (QCLot: 1692913)							
EP1806717-001	Anonymous	EK059G: Nitrite + Nitrate as N	----	0.5 mg/L	99.2	70	130
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser (QCLot: 1704612)							
EP1806719-003	Anonymous	EK061G: Total Kjeldahl Nitrogen as N	----	5 mg/L	93.3	70	130
EK067G: Total Phosphorus as P by Discrete Analyser (QCLot: 1704611)							
EP1806719-003	Anonymous	EK067G: Total Phosphorus as P	----	1 mg/L	105	70	130
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898)							

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 Work Order : EP1806725 Amendment 1
 Client : MRIA
 Project : 60478410



Sub-Matrix: WATER

				Matrix Spike (MS) Report			
				Spike	SpikeRecovery(%)	Recovery Limits (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	Low	High
EK071G: Reactive Phosphorus as P by discrete analyser (QCLot: 1692898) - continued							
EP1806722-001	Anonymous	EK071G: Reactive Phosphorus as P	14265-44-2	0.5 mg/L	105	70	130
EP080/071: Total Petroleum Hydrocarbons (QCLot: 1704359)							
EP1806718-001	Anonymous	EP080: C6 - C9 Fraction	----	240 µg/L	82.0	77	137
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions (QCLot: 1704359)							
EP1806718-001	Anonymous	EP080: C6 - C10 Fraction	C6_C10	290 µg/L	89.1	77	137
EP080: BTEXN (QCLot: 1704359)							
EP1806718-001	Anonymous	EP080: Benzene	71-43-2	20 µg/L	87.0	77	122
		EP080: Toluene	108-88-3	20 µg/L	81.7	74	126



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1706873	Page	: 1 of 8
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 28-Jun-2017
Site	: ----	Issue Date	: 05-Jul-2017
Sampler	: TIM WILLIAMSON	No. of samples received	: 8
Order number	: 60478410-2.06	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	30-Jun-2017	25-Dec-2017	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	03-Jul-2017	25-Dec-2017	✓	03-Jul-2017	25-Dec-2017	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	28-Jun-2017	26-Jul-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	28-Jun-2017	30-Jun-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	28-Jun-2017	26-Jul-2017	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	03-Jul-2017	26-Jul-2017	✓	03-Jul-2017	26-Jul-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	03-Jul-2017	26-Jul-2017	✓	03-Jul-2017	26-Jul-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	28-Jun-2017	30-Jun-2017	✓
EP008: Chlorophyll a & Pheophytin a							
White Plastic Bottle - Unpreserved (EP008) BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	----	----	----	29-Jun-2017	30-Jun-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617	28-Jun-2017	30-Jun-2017	05-Jul-2017	✓	30-Jun-2017	09-Aug-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B_, T3C_, BH10_, BLNS-B1_, A2_, A2S_, WQA02_280617, DB TBW 575	28-Jun-2017	03-Jul-2017	12-Jul-2017	✓	03-Jul-2017	12-Jul-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
T3B_, BH10_, A2_, WQA02_280617	T3C_, BLNS-B1_, A2S_	28-Jun-2017	30-Jun-2017	05-Jul-2017	✓	30-Jun-2017	09-Aug-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
T3B_, BH10_, A2_, WQA02_280617,	T3C_, BLNS-B1_, A2S_, DB TBW 575	28-Jun-2017	03-Jul-2017	12-Jul-2017	✓	03-Jul-2017	12-Jul-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
T3B_, BH10_, A2_, WQA02_280617,	T3C_, BLNS-B1_, A2S_, DB TBW 575	28-Jun-2017	03-Jul-2017	12-Jul-2017	✓	03-Jul-2017	12-Jul-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	19	10.53	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	14	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1706851	Page	: 1 of 8
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 27-Jun-2017
Site	: ----	Issue Date	: 03-Jul-2017
Sampler	: Tim Williamson	No. of samples received	: 12
Order number	: 60478410-2.06	No. of samples analysed	: 12

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatle Fraction	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)							
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	----	----	----	29-Jun-2017	24-Dec-2017	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T)							
WQA03_270617	27-Jun-2017	30-Jun-2017	24-Dec-2017	✓	30-Jun-2017	24-Dec-2017	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	----	----	----	28-Jun-2017	25-Jul-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G)							
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	----	----	----	28-Jun-2017	29-Jun-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	----	----	----	28-Jun-2017	25-Jul-2017	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	29-Jun-2017	25-Jul-2017	✓	29-Jun-2017	25-Jul-2017	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	29-Jun-2017	25-Jul-2017	✓	29-Jun-2017	25-Jul-2017	✓	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617	27-Jun-2017	----	----	----	28-Jun-2017	29-Jun-2017	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, WQA03_270617	GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617,	27-Jun-2017	29-Jun-2017	04-Jul-2017	✓	29-Jun-2017	08-Aug-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, WQA03_270617,	GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617, WQA04_DB TBW 576	27-Jun-2017	30-Jun-2017	11-Jul-2017	✓	30-Jun-2017	11-Jul-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, WQA03_270617	GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617,	27-Jun-2017	29-Jun-2017	04-Jul-2017	✓	29-Jun-2017	08-Aug-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, WQA03_270617,	GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617, WQA04_DB TBW 576	27-Jun-2017	30-Jun-2017	11-Jul-2017	✓	30-Jun-2017	11-Jul-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_, GW-D5_, GW-D8_, T4B_, GW-T3E-A, WQA03_270617,	GW-D4_, GW-D7_, T2F_, T4C_, WQA01_270617, WQA04_DB TBW 576	27-Jun-2017	30-Jun-2017	11-Jul-2017	✓	30-Jun-2017	11-Jul-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	30	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1707992	Page	: 1 of 8
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 26-Jul-2017
Site	: ----	Issue Date	: 01-Aug-2017
Sampler	: Tim Williamson	No. of samples received	: 11
Order number	: 60478410-2.06	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	----	----	----	31-Jul-2017	22-Jan-2018	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_260717		26-Jul-2017	28-Jul-2017	22-Jan-2018	✓	28-Jul-2017	22-Jan-2018	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	----	----	----	27-Jul-2017	23-Aug-2017	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	----	----	----	27-Jul-2017	28-Jul-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	----	----	----	27-Jul-2017	23-Aug-2017	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	01-Aug-2017	23-Aug-2017	✓	01-Aug-2017	23-Aug-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	01-Aug-2017	23-Aug-2017	✓	01-Aug-2017	23-Aug-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717,	26-Jul-2017	----	----	----	27-Jul-2017	28-Jul-2017	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717,	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717, WQA03_260717	26-Jul-2017	27-Jul-2017	02-Aug-2017	✓	27-Jul-2017	05-Sep-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717, WQA04_LR TBW701	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717, WQA03_260717,	26-Jul-2017	27-Jul-2017	09-Aug-2017	✓	27-Jul-2017	09-Aug-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717,	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717, WQA03_260717	26-Jul-2017	27-Jul-2017	02-Aug-2017	✓	27-Jul-2017	05-Sep-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717, WQA04_LR TBW701	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717, WQA03_260717,	26-Jul-2017	27-Jul-2017	09-Aug-2017	✓	27-Jul-2017	09-Aug-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_260717, GW-D7_260717, T3B_260717, T4B_260717, WQA01_260717, WQA04_LR TBW701	GW-D4_260717, GW-D8_260717, T3C_260717, BH10_260717, WQA03_260717,	26-Jul-2017	27-Jul-2017	09-Aug-2017	✓	27-Jul-2017	09-Aug-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

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Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	4	40	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	3	30	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	28	14.29	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	29	10.34	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	32	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	6.90	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	32	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	30	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	29	6.90	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	32	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1708050	Page	: 1 of 9
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MICHELLE OROURKE	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 27-Jul-2017
Site	: ----	Issue Date	: 07-Aug-2017
Sampler	: TIM WILLIAMSON	No. of samples received	: 15
Order number	: 60478410-2.06	No. of samples analysed	: 15

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	2	37	5.41	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D5_270717, T2F_270717, T3C_270717, BH12_270717, GW-T3E-A_270717, BLNS-B1_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717	27-Jul-2017	----	----	----	02-Aug-2017	23-Jan-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717	27-Jul-2017	02-Aug-2017	23-Jan-2018	✓	02-Aug-2017	23-Jan-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D5_270717, T2F_270717, T3C_270717, BH12_270717, GW-T3E-A_270717, BLNS-B1_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717	27-Jul-2017	----	----	----	28-Jul-2017	24-Aug-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717,	T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	----	----	----	28-Jul-2017	29-Jul-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717,	T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	----	----	----	28-Jul-2017	24-Aug-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717,	T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	04-Aug-2017	24-Aug-2017	✓	04-Aug-2017	24-Aug-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717,	T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	04-Aug-2017	24-Aug-2017	✓	04-Aug-2017	24-Aug-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717, T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	----	----	----	28-Jul-2017	29-Jul-2017	✓
EP008: Chlorophyll a & Pheophytin a							
Glass Fibre Filter Paper (Chlorophyll) (EP008) BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717 A2_270717, NLWS-N2_270717, FS2_270717, S1_270717	27-Jul-2017	----	----	----	03-Aug-2017	17-Aug-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_270717	27-Jul-2017	01-Aug-2017	03-Aug-2017	✓	01-Aug-2017	10-Sep-2017	✓
Amber Glass Bottle - Unpreserved (EP071) BH12_270717, GW-T3E-A_270717	27-Jul-2017	31-Jul-2017	03-Aug-2017	✓	01-Aug-2017	09-Sep-2017	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D5_270717, T3C_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717 T2F_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717	27-Jul-2017	31-Jul-2017	03-Aug-2017	✓	31-Jul-2017	09-Sep-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D5_270717, T3C_270717, GW-T3E-A_270717, A2_270717, NLWS-N2_270717, FS2_270717, S1_270717, WQA05_LRTBW700_270717 T2F_270717, BH12_270717, BLNS-B1_270717, A2S_270717, A1_270717, RD1_270717, WQA02_270717	27-Jul-2017	01-Aug-2017	10-Aug-2017	✓	02-Aug-2017	10-Aug-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_270717	27-Jul-2017	01-Aug-2017	03-Aug-2017	✓	01-Aug-2017	10-Sep-2017	✓
Amber Glass Bottle - Unpreserved (EP071) BH12_270717, GW-T3E-A_270717	27-Jul-2017	31-Jul-2017	03-Aug-2017	✓	01-Aug-2017	09-Sep-2017	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D5_270717, T2F_270717, T3C_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717	27-Jul-2017	31-Jul-2017	03-Aug-2017	✓	31-Jul-2017	09-Sep-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D5_270717, T2F_270717, T3C_270717, BH12_270717, GW-T3E-A_270717, BLNS-B1_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717, WQA05_LRTBW700_270717	27-Jul-2017	01-Aug-2017	10-Aug-2017	✓	02-Aug-2017	10-Aug-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) GW-D5_270717, T2F_270717, T3C_270717, BH12_270717, GW-T3E-A_270717, BLNS-B1_270717, A2_270717, A2S_270717, NLWS-N2_270717, A1_270717, FS2_270717, RD1_270717, S1_270717, WQA02_270717, WQA05_LRTBW700_270717	27-Jul-2017	01-Aug-2017	10-Aug-2017	✓	02-Aug-2017	10-Aug-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	13	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	5.41	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Ammonia as N by Discrete analyser	EK055G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1709130	Page	: 1 of 10
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 23-Aug-2017
Site	: ----	Issue Date	: 30-Aug-2017
Sampler	: Tim Williamson	No. of samples received	: 17
Order number	: 60478410-2.06	No. of samples analysed	: 17

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1709124--001	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP008: Chlorophyll a & Pheophytin a						
White Plastic Bottle - Unpreserved AIE_230817	----	----	----	29-Aug-2017	25-Aug-2017	4

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	1	20	5.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817, A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	----	----	----	28-Aug-2017	19-Feb-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817	23-Aug-2017	29-Aug-2017	19-Feb-2018	✓	29-Aug-2017	19-Feb-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817, A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	----	----	----	24-Aug-2017	20-Sep-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817, A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	----	----	----	24-Aug-2017	25-Aug-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	----	----	----	24-Aug-2017	20-Sep-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	28-Aug-2017	20-Sep-2017	✓	28-Aug-2017	20-Sep-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	28-Aug-2017	20-Sep-2017	✓	28-Aug-2017	20-Sep-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	----	----	----	24-Aug-2017	25-Aug-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817,	23-Aug-2017	----	----	----	29-Aug-2017	13-Sep-2017	✓
White Plastic Bottle - Unpreserved (EP008) AIE_230817		23-Aug-2017	----	----	----	29-Aug-2017	25-Aug-2017	*
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	25-Aug-2017	30-Aug-2017	✓	28-Aug-2017	04-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, AIE_230817, D2_230817	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, DBTBW780_230817, D1_230817,	23-Aug-2017	28-Aug-2017	06-Sep-2017	✓	28-Aug-2017	06-Sep-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, D1_230817,	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, AIE_230817, D2_230817	23-Aug-2017	25-Aug-2017	30-Aug-2017	✓	28-Aug-2017	04-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, AIE_230817, D2_230817	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, DBTBW780_230817, D1_230817,	23-Aug-2017	28-Aug-2017	06-Sep-2017	✓	28-Aug-2017	06-Sep-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
BLNS-B1_230817, A2S_230817, A1_230817, FS2_230817, RD1_230817, S1_230817, WQA02_230817, AIE_230817, D2_230817	A2_230817, NLWS-N2_230817, A1N_230817, FS4A_230817, RD1A_230817, A3_230817, DBTBW780_230817, D1_230817,	23-Aug-2017	28-Aug-2017	06-Sep-2017	✓	28-Aug-2017	06-Sep-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✘ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	16	0.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	35	11.43	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1709182	Page	: 1 of 9
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 24-Aug-2017
Site	: ----	Issue Date	: 30-Aug-2017
Sampler	: Tim Williamson	No. of samples received	: 13
Order number	: 60475410-2.06	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	EP1709162--001	Anonymous	Ammonia as N	7664-41-7	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1709162--001	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	1	25	4.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	1	25	4.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for **VOC in soils** vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)								
GW-D3_ GW-D7_ T2F_ T3C_ BH10_ GW-T3E-A,	GW-D5_ GW-D8_ T3B_ T4B_ BH12_ WQA01_240817	24-Aug-2017	----	----	----	29-Aug-2017	20-Feb-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	----	----	----	24-Aug-2017	21-Sep-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	----	----	----	24-Aug-2017	26-Aug-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	----	----	----	24-Aug-2017	21-Sep-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	29-Aug-2017	21-Sep-2017	✓	29-Aug-2017	21-Sep-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	29-Aug-2017	21-Sep-2017	✓	29-Aug-2017	21-Sep-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G)							
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	----	----	----	24-Aug-2017	26-Aug-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071)							
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	25-Aug-2017	31-Aug-2017	✓	28-Aug-2017	04-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, WQA06_DBTBW779 - TBW 779 GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817,	24-Aug-2017	25-Aug-2017	07-Sep-2017	✓	25-Aug-2017	07-Sep-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Vial - Unpreserved (EP071)							
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817	24-Aug-2017	25-Aug-2017	31-Aug-2017	✓	28-Aug-2017	04-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, WQA06_DBTBW779 - TBW 779 GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817,	24-Aug-2017	25-Aug-2017	07-Sep-2017	✓	25-Aug-2017	07-Sep-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3_, GW-D7_, T2F_, T3C_, BH10_, GW-T3E-A, WQA06_DBTBW779 - TBW 779	GW-D5_, GW-D8_, T3B_, T4B_, BH12_, WQA01_240817,	24-Aug-2017	25-Aug-2017	07-Sep-2017	✓	25-Aug-2017	07-Sep-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	28	10.71	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	25	4.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	25	8.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	25	8.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	25	4.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1709224	Page	: 1 of 7
Client	: AECOM Australia Pty Ltd	Laboratory	: Environmental Division Perth
Contact	: MR CHRIS MCGRAGHAN	Telephone	: 08 9209 7655
Project	: 60478410	Date Samples Received	: 25-Aug-2017
Site	: ----	Issue Date	: 31-Aug-2017
Sampler	: Tim Williamson	No. of samples received	: 3
Order number	: 60478410-2.06	No. of samples analysed	: 3

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1709224--001	GW-D4_	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D4_ T4C_	25-Aug-2017	----	----	----	30-Aug-2017	21-Feb-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_	25-Aug-2017	30-Aug-2017	21-Feb-2018	✓	30-Aug-2017	21-Feb-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D4_ T4C_	25-Aug-2017	----	----	----	25-Aug-2017	22-Sep-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D4_ T4C_	25-Aug-2017	----	----	----	25-Aug-2017	27-Aug-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D4_ T4C_	25-Aug-2017	----	----	----	25-Aug-2017	22-Sep-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D4_, T4C_	25-Aug-2017	30-Aug-2017	22-Sep-2017	✓	30-Aug-2017	22-Sep-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D4_, T4C_	25-Aug-2017	30-Aug-2017	22-Sep-2017	✓	30-Aug-2017	22-Sep-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D4_, T4C_	25-Aug-2017	----	----	----	25-Aug-2017	27-Aug-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) GW-D4_, WQA03_, T4C_	25-Aug-2017	28-Aug-2017	01-Sep-2017	✓	29-Aug-2017	07-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4_, WQA03_, T4C_	25-Aug-2017	30-Aug-2017	08-Sep-2017	✓	30-Aug-2017	08-Sep-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) GW-D4_, WQA03_, T4C_	25-Aug-2017	28-Aug-2017	01-Sep-2017	✓	29-Aug-2017	07-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4_, WQA03_, T4C_	25-Aug-2017	30-Aug-2017	08-Sep-2017	✓	30-Aug-2017	08-Sep-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4_, WQA03_, T4C_	25-Aug-2017	30-Aug-2017	08-Sep-2017	✓	30-Aug-2017	08-Sep-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	1	2	50.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	3	66.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1710701	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 28-Sep-2017
Site	: ----	Issue Date	: 04-Oct-2017
Sampler	: Tim Williamson	No. of samples received	: 11
Order number	: W81020-103	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1710701--009	GW-D7	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	1	19	5.26	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F)								
D1, BH10, T3C, T4C, GW-D7,	D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	03-Oct-2017	26-Mar-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F)								
D1, BH10, T3C, T4C, GW-D7,	D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	03-Oct-2017	26-Mar-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	28-Sep-2017	25-Oct-2017	✓	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	28-Sep-2017	29-Sep-2017	✓	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	28-Sep-2017	25-Oct-2017	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	04-Oct-2017	25-Oct-2017	✓	04-Oct-2017	25-Oct-2017	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	04-Oct-2017	25-Oct-2017	✓	04-Oct-2017	25-Oct-2017	✓	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) D1, BH10, T3C, T4C, GW-D7, D2, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	----	----	----	28-Sep-2017	29-Sep-2017	✓	



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) D1, D2	27-Sep-2017	02-Oct-2017	04-Oct-2017	✓	03-Oct-2017	11-Nov-2017	✓	
Amber Glass Bottle - Unpreserved (EP071) BH10, T3C, T4C, GW-D7, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	03-Oct-2017	04-Oct-2017	✓	03-Oct-2017	12-Nov-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D1, BH10, T3C, T4C, GW-D7, WQA06_DB TBW 869, D2, T3B, T4B, GW-D4, WQA01_260917,	27-Sep-2017	03-Oct-2017	11-Oct-2017	✓	03-Oct-2017	11-Oct-2017	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) D1, D2	27-Sep-2017	02-Oct-2017	04-Oct-2017	✓	03-Oct-2017	11-Nov-2017	✓	
Amber Glass Bottle - Unpreserved (EP071) BH10, T3C, T4C, GW-D7, T3B, T4B, GW-D4, WQA01_260917	27-Sep-2017	03-Oct-2017	04-Oct-2017	✓	03-Oct-2017	12-Nov-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D1, BH10, T3C, T4C, GW-D7, WQA06_DB TBW 869, D2, T3B, T4B, GW-D4, WQA01_260917,	27-Sep-2017	03-Oct-2017	11-Oct-2017	✓	03-Oct-2017	11-Oct-2017	✓	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) D1, BH10, T3C, T4C, GW-D7, WQA06_DB TBW 869, D2, T3B, T4B, GW-D4, WQA01_260917,	27-Sep-2017	03-Oct-2017	11-Oct-2017	✓	03-Oct-2017	11-Oct-2017	✓	



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	4	38	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	31	12.90	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1710595	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 26-Sep-2017
Site	: ----	Issue Date	: 04-Oct-2017
Sampler	: Tim Williamson	No. of samples received	: 11
Order number	: W81020-103	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	29-Sep-2017	25-Mar-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) A1E, A1, A3, A1N, NLWS-N2, S1	26-Sep-2017	29-Sep-2017	25-Mar-2018	✓	29-Sep-2017	25-Mar-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	04-Oct-2017	25-Mar-2018	✓
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG094B-T) A1E, A1, A3, A1N, NLWS-N2, S1	26-Sep-2017	04-Oct-2017	25-Mar-2018	✓	04-Oct-2017	25-Mar-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	26-Sep-2017	24-Oct-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	26-Sep-2017	28-Sep-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	26-Sep-2017	24-Oct-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	02-Oct-2017	24-Oct-2017	✓	02-Oct-2017	24-Oct-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	02-Oct-2017	24-Oct-2017	✓	02-Oct-2017	24-Oct-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	26-Sep-2017	28-Sep-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) A1E, A1, A3, A1N, NLWS-N2, S1	26-Sep-2017	----	----	----	02-Oct-2017	17-Oct-2017	✓	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	29-Sep-2017	03-Oct-2017	✓	29-Sep-2017	08-Nov-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3, T2F, A1E, A1, A3, WQA05_BD TBW 868 GW-D5, GW-T3E-A, A1N, NLWS-N2, S1,	26-Sep-2017	29-Sep-2017	10-Oct-2017	✓	29-Sep-2017	10-Oct-2017	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) GW-D3, T2F, A1E, A1, A3, GW-D5, GW-T3E-A, A1N, NLWS-N2, S1	26-Sep-2017	29-Sep-2017	03-Oct-2017	✓	29-Sep-2017	08-Nov-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3, T2F, A1E, A1, A3, WQA05_BD TBW 868 GW-D5, GW-T3E-A, A1N, NLWS-N2, S1,	26-Sep-2017	29-Sep-2017	10-Oct-2017	✓	29-Sep-2017	10-Oct-2017	✓	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3, T2F, A1E, A1, A3, WQA05_BD TBW 868 GW-D5, GW-T3E-A, A1N, NLWS-N2, S1,	26-Sep-2017	29-Sep-2017	10-Oct-2017	✓	29-Sep-2017	10-Oct-2017	✓	



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	11	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	37	10.81	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	6	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	37	10.81	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	37	5.41	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1710522	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 22-Sep-2017
Site	: ----	Issue Date	: 03-Oct-2017
Sampler	: Tim Williamson	No. of samples received	: 2
Order number	: W81020-103	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1710492--001	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	11	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	11	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) BH12, GW-D8	22-Sep-2017	----	----	----	28-Sep-2017	21-Mar-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) BH12, GW-D8	22-Sep-2017	----	----	----	30-Sep-2017	21-Mar-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH12, GW-D8	22-Sep-2017	----	----	----	22-Sep-2017	20-Oct-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH12, GW-D8	22-Sep-2017	----	----	----	22-Sep-2017	24-Sep-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH12, GW-D8	22-Sep-2017	----	----	----	22-Sep-2017	20-Oct-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH12, GW-D8	22-Sep-2017	28-Sep-2017	20-Oct-2017	✓	28-Sep-2017	20-Oct-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH12, GW-D8	22-Sep-2017	28-Sep-2017	20-Oct-2017	✓	28-Sep-2017	20-Oct-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH12, GW-D8	22-Sep-2017	----	----	----	22-Sep-2017	24-Sep-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D8	22-Sep-2017	28-Sep-2017	29-Sep-2017	✓	29-Sep-2017	07-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	22-Sep-2017	28-Sep-2017	06-Oct-2017	✓	28-Sep-2017	06-Oct-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D8	22-Sep-2017	28-Sep-2017	29-Sep-2017	✓	29-Sep-2017	07-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	22-Sep-2017	28-Sep-2017	06-Oct-2017	✓	28-Sep-2017	06-Oct-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	22-Sep-2017	28-Sep-2017	06-Oct-2017	✓	28-Sep-2017	06-Oct-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	5	40.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	11	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1710339	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA - R8 Water Monitoring	Date Samples Received	: 19-Sep-2017
Site	: ----	Issue Date	: 27-Sep-2017
Sampler	: Tim Williamson	No. of samples received	: 8
Order number	: W81020-103	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	26	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	20	5.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	23-Sep-2017	18-Mar-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	23-Sep-2017	18-Mar-2018	✓	23-Sep-2017	18-Mar-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	22-Sep-2017	18-Mar-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	22-Sep-2017	18-Mar-2018	✓	22-Sep-2017	18-Mar-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	20-Sep-2017	17-Oct-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	20-Sep-2017	21-Sep-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	20-Sep-2017	17-Oct-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	26-Sep-2017	17-Oct-2017	✓	27-Sep-2017	17-Oct-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	26-Sep-2017	17-Oct-2017	✓	27-Sep-2017	17-Oct-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	20-Sep-2017	21-Sep-2017	✓
EP008: Chlorophyll a & Pheophytin a							
White Plastic Bottle - Unpreserved (EP008) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	----	----	----	20-Sep-2017	21-Sep-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	21-Sep-2017	26-Sep-2017	✓	22-Sep-2017	31-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	26-Sep-2017	03-Oct-2017	✓	26-Sep-2017	03-Oct-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	21-Sep-2017	26-Sep-2017	✓	22-Sep-2017	31-Oct-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	26-Sep-2017	03-Oct-2017	✓	26-Sep-2017	03-Oct-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1, A2, A2S, FS2, FS4A, RD1, RD1A, WQA02_190917	19-Sep-2017	26-Sep-2017	03-Oct-2017	✓	26-Sep-2017	03-Oct-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	26	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	9	22.22	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	26	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP17111669	Page	: 1 of 10
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 19-Oct-2017
Site	: ----	Issue Date	: 26-Oct-2017
Sampler	: Rachel Champion	No. of samples received	: 13
Order number	: W81020-103	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	18	5.56	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	25-Oct-2017	16-Apr-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	25-Oct-2017	17-Apr-2018	✓
EG020T: Total Metals by ICP-MS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	25-Oct-2017	16-Apr-2018	✓	25-Oct-2017	16-Apr-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	25-Oct-2017	16-Apr-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	25-Oct-2017	17-Apr-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG094T: Total metals in Fresh water by ORC-ICPMS								
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG094B-T) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	25-Oct-2017	16-Apr-2018	✓	25-Oct-2017	16-Apr-2018	✓
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	19-Oct-2017	15-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	19-Oct-2017	16-Nov-2017	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	19-Oct-2017	20-Oct-2017	✓
Clear Plastic Bottle - Natural (EK057G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	19-Oct-2017	21-Oct-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	19-Oct-2017	15-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	19-Oct-2017	16-Nov-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	23-Oct-2017	15-Nov-2017	✓	23-Oct-2017	15-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	23-Oct-2017	16-Nov-2017	✓	23-Oct-2017	16-Nov-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	23-Oct-2017	15-Nov-2017	✓	23-Oct-2017	15-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	23-Oct-2017	16-Nov-2017	✓	23-Oct-2017	16-Nov-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	19-Oct-2017	20-Oct-2017	✓
Clear Plastic Bottle - Natural (EK071G) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	----	----	----	19-Oct-2017	21-Oct-2017	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	----	----	----	24-Oct-2017	08-Nov-2017	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	24-Oct-2017	25-Oct-2017	✓	24-Oct-2017	03-Dec-2017	✓
Amber Glass Bottle - Unpreserved (EP071) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	24-Oct-2017	26-Oct-2017	✓	24-Oct-2017	03-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	23-Oct-2017	01-Nov-2017	✓	23-Oct-2017	01-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	23-Oct-2017	02-Nov-2017	✓	23-Oct-2017	02-Nov-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	24-Oct-2017	25-Oct-2017	✓	24-Oct-2017	03-Dec-2017	✓
Amber Glass Bottle - Unpreserved (EP071) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	24-Oct-2017	26-Oct-2017	✓	24-Oct-2017	03-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	23-Oct-2017	01-Nov-2017	✓	23-Oct-2017	01-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	23-Oct-2017	02-Nov-2017	✓	23-Oct-2017	02-Nov-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1,	A2S, WQA02_171017	18-Oct-2017	23-Oct-2017	01-Nov-2017	✓	23-Oct-2017	01-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C, T2F, T3B, GW-D3, WQA01_191017	GW-T3E-A, GW-D5, BH10, GW-D7,	19-Oct-2017	23-Oct-2017	02-Nov-2017	✓	23-Oct-2017	02-Nov-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	13	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	35	11.43	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	28	10.71	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	18	5.56	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1711878	Page	: 1 of 10
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 24-Oct-2017
Site	: ----	Issue Date	: 31-Oct-2017
Sampler	: Tim Williamson	No. of samples received	: 15
Order number	: W81020-103	No. of samples analysed	: 15

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatle Fraction	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	30-Oct-2017	21-Apr-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
GW-D4, T3C, D2, T4B, D1,	24-Oct-2017	----	----	----	30-Oct-2017	22-Apr-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)							
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	27-Oct-2017	21-Apr-2018	✓	27-Oct-2017	21-Apr-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	30-Oct-2017	21-Apr-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	----	----	----	30-Oct-2017	22-Apr-2018	✓
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG094B-T) A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	30-Oct-2017	21-Apr-2018	✓	30-Oct-2017	21-Apr-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	24-Oct-2017	20-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	----	----	----	24-Oct-2017	21-Nov-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	24-Oct-2017	25-Oct-2017	✓
Clear Plastic Bottle - Natural (EK057G) GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	----	----	----	24-Oct-2017	26-Oct-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) A1, A1E, FS2, RD1, S1,	A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	24-Oct-2017	20-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D4, T3C, D2	T4B, D1,	24-Oct-2017	----	----	----	24-Oct-2017	21-Nov-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) A1, A1E, FS2, RD1, S1,	A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	31-Oct-2017	20-Nov-2017	✓	31-Oct-2017	20-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D4, T3C, D2	T4B, D1,	24-Oct-2017	31-Oct-2017	21-Nov-2017	✓	31-Oct-2017	21-Nov-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) A1, A1E, FS2, RD1, S1,	A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	31-Oct-2017	20-Nov-2017	✓	31-Oct-2017	20-Nov-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D4, T3C, D2	T4B, D1,	24-Oct-2017	31-Oct-2017	21-Nov-2017	✓	31-Oct-2017	21-Nov-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	24-Oct-2017	25-Oct-2017	✓	
Clear Plastic Bottle - Natural (EK071G)								
GW-D4, T3C, D2 T4B, D1	24-Oct-2017	----	----	----	24-Oct-2017	26-Oct-2017	✓	
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008)								
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	----	----	----	30-Oct-2017	13-Nov-2017	✓	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	27-Oct-2017	30-Oct-2017	✓	27-Oct-2017	06-Dec-2017	✓	
Amber Glass Bottle - Unpreserved (EP071)								
GW-D4, T3C, D2 T4B, D1	24-Oct-2017	27-Oct-2017	31-Oct-2017	✓	27-Oct-2017	06-Dec-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	30-Oct-2017	06-Nov-2017	✓	30-Oct-2017	06-Nov-2017	✓	
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D4, T3C, D2 T4B, D1	24-Oct-2017	30-Oct-2017	07-Nov-2017	✓	30-Oct-2017	07-Nov-2017	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071)							
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	27-Oct-2017	30-Oct-2017	✓	27-Oct-2017	06-Dec-2017	✓
Amber Glass Bottle - Unpreserved (EP071)							
GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	27-Oct-2017	31-Oct-2017	✓	27-Oct-2017	06-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	30-Oct-2017	06-Nov-2017	✓	30-Oct-2017	06-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	30-Oct-2017	07-Nov-2017	✓	30-Oct-2017	07-Nov-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080)							
A1, A1E, FS2, RD1, S1, A1N, NLWS-N2, FS4A, RD1A, A3	23-Oct-2017	30-Oct-2017	06-Nov-2017	✓	30-Oct-2017	06-Nov-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)							
GW-D4, T3C, D2 T4B, D1,	24-Oct-2017	30-Oct-2017	07-Nov-2017	✓	30-Oct-2017	07-Nov-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	14	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	33	12.12	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1712054	Page	: 1 of 7
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 27-Oct-2017
Site	: ----	Issue Date	: 06-Nov-2017
Sampler	: Rachel Champion	No. of samples received	: 2
Order number	: W81020-103	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1712029--001	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	8	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	8	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BH12, GW-D8	26-Oct-2017	----	----	----	01-Nov-2017	24-Apr-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) BH12, GW-D8	26-Oct-2017	----	----	----	02-Nov-2017	24-Apr-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH12, GW-D8	26-Oct-2017	----	----	----	27-Oct-2017	23-Nov-2017	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH12, GW-D8	26-Oct-2017	----	----	----	27-Oct-2017	28-Oct-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH12, GW-D8	26-Oct-2017	----	----	----	27-Oct-2017	23-Nov-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH12, GW-D8	26-Oct-2017	03-Nov-2017	23-Nov-2017	✓	04-Nov-2017	23-Nov-2017	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH12, GW-D8	26-Oct-2017	03-Nov-2017	23-Nov-2017	✓	04-Nov-2017	23-Nov-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH12, GW-D8	26-Oct-2017	----	----	----	27-Oct-2017	28-Oct-2017	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D8	26-Oct-2017	31-Oct-2017	02-Nov-2017	✓	01-Nov-2017	10-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	26-Oct-2017	02-Nov-2017	09-Nov-2017	✓	02-Nov-2017	09-Nov-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D8	26-Oct-2017	31-Oct-2017	02-Nov-2017	✓	01-Nov-2017	10-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	26-Oct-2017	02-Nov-2017	09-Nov-2017	✓	02-Nov-2017	09-Nov-2017	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D8	26-Oct-2017	02-Nov-2017	09-Nov-2017	✓	02-Nov-2017	09-Nov-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	50.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	8	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>			
<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>	
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>			
<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>	
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1712990	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 17-Nov-2017
Site	: ----	Issue Date	: 27-Nov-2017
Sampler	: Rachel Champion	No. of samples received	: 14
Order number	: W81020-103	No. of samples analysed	: 14

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	6	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) D1, D2, T2F, GW-T3E-A, GW-D3, GW-D4, GW-D5, T3B, T4B, WQA02_151117, BLNS-B1, A2, A2S	17-Nov-2017	----	----	----	23-Nov-2017	16-May-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) WQA02_151117, BLNS-B1, A2, A2S	17-Nov-2017	23-Nov-2017	16-May-2018	✓	23-Nov-2017	16-May-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) D1, D2, T2F, GW-T3E-A, GW-D3, GW-D4, GW-D5, T3B, T4B, WQA02_151117, BLNS-B1, A2, A2S	17-Nov-2017	----	----	----	24-Nov-2017	16-May-2018	✓
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG094B-T) WQA02_151117, BLNS-B1, A2, A2S	17-Nov-2017	24-Nov-2017	16-May-2018	✓	24-Nov-2017	16-May-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	----	----	----	17-Nov-2017	15-Dec-2017	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	----	----	----	17-Nov-2017	19-Nov-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	----	----	----	17-Nov-2017	15-Dec-2017	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	21-Nov-2017	15-Dec-2017	✓	21-Nov-2017	15-Dec-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	21-Nov-2017	15-Dec-2017	✓	21-Nov-2017	15-Dec-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	----	----	----	17-Nov-2017	19-Nov-2017	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008)								
WQA02_151117, A2,	BLNS-B1, A2S	17-Nov-2017	----	----	----	21-Nov-2017	08-Dec-2017	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	22-Nov-2017	24-Nov-2017	✓	23-Nov-2017	01-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S,	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2, WQA05_DB TBW 1132	17-Nov-2017	22-Nov-2017	01-Dec-2017	✓	22-Nov-2017	01-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2,	17-Nov-2017	22-Nov-2017	24-Nov-2017	✓	23-Nov-2017	01-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S,	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2, WQA05_DB TBW 1132	17-Nov-2017	22-Nov-2017	01-Dec-2017	✓	22-Nov-2017	01-Dec-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
D1, T2F, GW-D3, GW-D5, T4B, BLNS-B1, A2S,	D2, GW-T3E-A, GW-D4, T3B, WQA02_151117, A2, WQA05_DB TBW 1132	17-Nov-2017	22-Nov-2017	01-Dec-2017	✓	22-Nov-2017	01-Dec-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	6	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	4	25.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1712847	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 15-Nov-2017
Site	: ----	Issue Date	: 22-Nov-2017
Sampler	: Rachel Champion	No. of samples received	: 9
Order number	: W81020-103	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	EP1712848--001	Anonymous	Total Kjeldahl Nitrogen as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	24	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis									
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation							
EG020F: Dissolved Metals by ICP-MS														
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)	15-Nov-2017	----	----	----	21-Nov-2017	14-May-2018	✓							
A1, A1E, FS2, RD1, A3								A1N, NLWS-N2, FS4A, S1,						
EG020T: Total Metals by ICP-MS														
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)								15-Nov-2017	21-Nov-2017	14-May-2018	✓	21-Nov-2017	14-May-2018	✓
A1, A1E, FS2, RD1, A3														



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	22-Nov-2017	14-May-2018	✓	
EG094T: Total metals in Fresh water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG094B-T) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	22-Nov-2017	14-May-2018	✓	22-Nov-2017	14-May-2018	✓	
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	15-Nov-2017	13-Dec-2017	✓	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	15-Nov-2017	17-Nov-2017	✓	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	15-Nov-2017	13-Dec-2017	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) A1, A1E, FS2, RD1, A3 A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	13-Dec-2017	✓	17-Nov-2017	13-Dec-2017	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	13-Dec-2017	✓	17-Nov-2017	13-Dec-2017	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	15-Nov-2017	17-Nov-2017	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	----	----	----	16-Nov-2017	06-Dec-2017	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	22-Nov-2017	✓	20-Nov-2017	27-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	29-Nov-2017	✓	17-Nov-2017	29-Nov-2017	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	22-Nov-2017	✓	20-Nov-2017	27-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	29-Nov-2017	✓	17-Nov-2017	29-Nov-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, RD1, A3	A1N, NLWS-N2, FS4A, S1,	15-Nov-2017	17-Nov-2017	29-Nov-2017	✓	17-Nov-2017	29-Nov-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	24	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	37	10.81	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	2	10	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	24	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	2	24	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1714429	Page	: 1 of 10
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 20-Dec-2017
Site	: ----	Issue Date	: 29-Dec-2017
Sampler	: Rachel Champion	No. of samples received	: 16
Order number	: W81020-103	No. of samples analysed	: 16

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatle Fraction	0	16	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatle Fraction	0	16	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) BH-12, D1, T4B, D2, GW-D4, T4B, GW-D3	19-Dec-2017	----	----	----	22-Dec-2017	17-Jun-2018	✔
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-T3E-A, GW-D5, T2F, T3C, BH10, T3B, GW-D8	20-Dec-2017	----	----	----	22-Dec-2017	18-Jun-2018	✔
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG093B-F) BH-12, D1, T4B, D2, GW-D4, T4B, GW-D3	19-Dec-2017	----	----	----	22-Dec-2017	17-Jun-2018	✔
Clear Plastic Bottle - Filtered; Lab-acidified (EG093B-F) GW-T3E-A, GW-D5, T2F, T3C, BH10, T3B, GW-D8	20-Dec-2017	----	----	----	22-Dec-2017	18-Jun-2018	✔



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B	19-Dec-2017	----	----	----	20-Dec-2017	16-Jan-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B	20-Dec-2017	----	----	----	20-Dec-2017	17-Jan-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B	19-Dec-2017	----	----	----	20-Dec-2017	21-Dec-2017	✓
Clear Plastic Bottle - Natural (EK057G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B	20-Dec-2017	----	----	----	20-Dec-2017	22-Dec-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B	19-Dec-2017	----	----	----	20-Dec-2017	16-Jan-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B	20-Dec-2017	----	----	----	20-Dec-2017	17-Jan-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B,	19-Dec-2017	28-Dec-2017	16-Jan-2018	✓	28-Dec-2017	16-Jan-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B,	20-Dec-2017	28-Dec-2017	17-Jan-2018	✓	28-Dec-2017	17-Jan-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B,	19-Dec-2017	28-Dec-2017	16-Jan-2018	✓	28-Dec-2017	16-Jan-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B,	20-Dec-2017	28-Dec-2017	17-Jan-2018	✓	28-Dec-2017	17-Jan-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH-12, T4B, GW-D4, GW-D3 D1, D2, T4B,	19-Dec-2017	----	----	----	20-Dec-2017	21-Dec-2017	✓
Clear Plastic Bottle - Natural (EK071G) GW-T3E-A, T2F, BH10, GW-D8 GW-D5, T3C, T3B,	20-Dec-2017	----	----	----	20-Dec-2017	22-Dec-2017	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) BH-12, T4B, GW-D4, GW-D3	D1, D2, T4B,	19-Dec-2017	21-Dec-2017	26-Dec-2017	✓	21-Dec-2017	30-Jan-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-T3E-A, T2F, BH10, GW-D8	GW-D5, T3C, T3B,	20-Dec-2017	21-Dec-2017	27-Dec-2017	✓	21-Dec-2017	30-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH-12, T4B, GW-D4, GW-D3, T4B-B	D1, D2, T4B, T4B-A,	19-Dec-2017	22-Dec-2017	02-Jan-2018	✓	22-Dec-2017	02-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-T3E-A, T2F, BH10, GW-D8	GW-D5, T3C, T3B,	20-Dec-2017	22-Dec-2017	03-Jan-2018	✓	22-Dec-2017	03-Jan-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
BH-12, T4B, GW-D4, GW-D3	D1, D2, T4B,	19-Dec-2017	21-Dec-2017	26-Dec-2017	✓	21-Dec-2017	30-Jan-2018	✓
Amber Glass Bottle - Unpreserved (EP071)								
GW-T3E-A, T2F, BH10, GW-D8	GW-D5, T3C, T3B,	20-Dec-2017	21-Dec-2017	27-Dec-2017	✓	21-Dec-2017	30-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
BH-12, T4B, GW-D4, GW-D3, T4B-B	D1, D2, T4B, T4B-A,	19-Dec-2017	22-Dec-2017	02-Jan-2018	✓	22-Dec-2017	02-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, T2F, BH10, GW-D8	GW-D5, T3C, T3B,	20-Dec-2017	22-Dec-2017	03-Jan-2018	✓	22-Dec-2017	03-Jan-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
BH-12, T4B, GW-D4, GW-D3, T4B-B	D1, D2, T4B, T4B-A,	19-Dec-2017	22-Dec-2017	02-Jan-2018	✓	22-Dec-2017	02-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, T2F, BH10, GW-D8	GW-D5, T3C, T3B,	20-Dec-2017	22-Dec-2017	03-Jan-2018	✓	22-Dec-2017	03-Jan-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	37	10.81	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	4	31	12.90	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	2	37	5.41	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	16	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1714152	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 14-Dec-2017
Site	: ----	Issue Date	: 22-Dec-2017
Sampler	: Rachel Champion	No. of samples received	: 9
Order number	: W81020-103	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	18-Dec-2017	11-Jun-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	18-Dec-2017	11-Jun-2018	✓	18-Dec-2017	11-Jun-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	20-Dec-2017	11-Jun-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG094B-T) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	20-Dec-2017	11-Jun-2018	✓	20-Dec-2017	11-Jun-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	14-Dec-2017	10-Jan-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	14-Dec-2017	15-Dec-2017	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	14-Dec-2017	10-Jan-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	20-Dec-2017	10-Jan-2018	✓	20-Dec-2017	10-Jan-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) A1, A1E, FS2, BLNS-B1, WQA02_131217 A1N, NLWS-N2, A2S, A2,	13-Dec-2017	20-Dec-2017	10-Jan-2018	✓	20-Dec-2017	10-Jan-2018	✓

Page : 4 of 9
 Work Order : EP1714152
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	14-Dec-2017	15-Dec-2017	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	----	----	----	19-Dec-2017	03-Jan-2018	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	19-Dec-2017	20-Dec-2017	✓	20-Dec-2017	28-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	19-Dec-2017	27-Dec-2017	✓	19-Dec-2017	27-Dec-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	19-Dec-2017	20-Dec-2017	✓	20-Dec-2017	28-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	19-Dec-2017	27-Dec-2017	✓	19-Dec-2017	27-Dec-2017	✓

Page : 5 of 9
 Work Order : EP1714152
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E, FS2, BLNS-B1, WQA02_131217	A1N, NLWS-N2, A2S, A2,	13-Dec-2017	19-Dec-2017	27-Dec-2017	✓	19-Dec-2017	27-Dec-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	9	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	9	22.22	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	22	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	15	6.67	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	22	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	22	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	22	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1801308	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 16-Jan-2018
Site	: ----	Issue Date	: 25-Jan-2018
Sampler	: Rachel Champion	No. of samples received	: 6
Order number	: W81020-103	No. of samples analysed	: 6

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	EP1801306--004	Anonymous	Total Kjeldahl Nitrogen as N	----	65.0 %	70-130%	Recovery less than lower data quality objective

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	20	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) BH12	15-Jan-2018	----	----	----	23-Jan-2018	14-Jul-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) A1, A1E, GW-D8	16-Jan-2018	----	----	----	23-Jan-2018	15-Jul-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) A1, A1E,	16-Jan-2018	23-Jan-2018	15-Jul-2018	✓	23-Jan-2018	15-Jul-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) BH12	15-Jan-2018	----	----	----	24-Jan-2018	14-Jul-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) A1, A1E, GW-D8 A1N, NLWS-N2,	16-Jan-2018	----	----	----	24-Jan-2018	15-Jul-2018	✓
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG094B-T) A1, A1E,	A1N, NLWS-N2 16-Jan-2018	24-Jan-2018	15-Jul-2018	✓	24-Jan-2018	15-Jul-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH12	15-Jan-2018	----	----	----	19-Jan-2018	12-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) A1, A1E, GW-D8 A1N, NLWS-N2,	16-Jan-2018	----	----	----	19-Jan-2018	13-Feb-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BH12	15-Jan-2018	----	----	----	17-Jan-2018	17-Jan-2018	✓
Clear Plastic Bottle - Natural (EK057G) A1, A1E, GW-D8 A1N, NLWS-N2,	16-Jan-2018	----	----	----	17-Jan-2018	18-Jan-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH12	15-Jan-2018	----	----	----	19-Jan-2018	12-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) A1, A1E, GW-D8 A1N, NLWS-N2,	16-Jan-2018	----	----	----	19-Jan-2018	13-Feb-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH12	15-Jan-2018	22-Jan-2018	12-Feb-2018	✓	22-Jan-2018	12-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) A1, A1E, GW-D8 A1N, NLWS-N2,	16-Jan-2018	22-Jan-2018	13-Feb-2018	✓	22-Jan-2018	13-Feb-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH12	15-Jan-2018	22-Jan-2018	12-Feb-2018	✓	22-Jan-2018	12-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	22-Jan-2018	13-Feb-2018	✓	22-Jan-2018	13-Feb-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) BH12	15-Jan-2018	----	----	----	17-Jan-2018	17-Jan-2018	✓
Clear Plastic Bottle - Natural (EK071G) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	----	----	----	17-Jan-2018	18-Jan-2018	✓
EP008: Chlorophyll a & Pheophytin a							
Glass Fibre Filter Paper (Chlorophyll) (EP008) A1, A1E,	A1N, NLWS-N2, 16-Jan-2018	----	----	----	19-Jan-2018	06-Feb-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) BH12	15-Jan-2018	22-Jan-2018	22-Jan-2018	✓	23-Jan-2018	03-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	18-Jan-2018	23-Jan-2018	✓	23-Jan-2018	27-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12	15-Jan-2018	23-Jan-2018	29-Jan-2018	✓	23-Jan-2018	29-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	23-Jan-2018	30-Jan-2018	✓	23-Jan-2018	30-Jan-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) BH12	15-Jan-2018	22-Jan-2018	22-Jan-2018	✓	23-Jan-2018	03-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	18-Jan-2018	23-Jan-2018	✓	23-Jan-2018	27-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12	15-Jan-2018	23-Jan-2018	29-Jan-2018	✓	23-Jan-2018	29-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	23-Jan-2018	30-Jan-2018	✓	23-Jan-2018	30-Jan-2018	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) BH12	15-Jan-2018	23-Jan-2018	29-Jan-2018	✓	23-Jan-2018	29-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A1, A1E, GW-D8	A1N, NLWS-N2, 16-Jan-2018	23-Jan-2018	30-Jan-2018	✓	23-Jan-2018	30-Jan-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM1801446	Page	: 1 of 10
Client	: MRIA	Laboratory	: Environmental Division Melbourne
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: Roe 8 Rehab	Date Samples Received	: 16-Jan-2018
Site	: ----	Issue Date	: 24-Jan-2018
Sampler	: ----	No. of samples received	: 9
Order number	: W81020-103	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK055G: Ammonia as N by Discrete Analyser	EB1801928--001	Anonymous	Ammonia as N	7664-41-7	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK071G: Reactive Phosphorus as P by discrete analyser	EM1801208--069	Anonymous	Reactive Phosphorus as P	14265-44-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural							
D1, GW05, BLNS-B1, A2S,	GW03, T4C, WQA02, A2	----	----	----	16-Jan-2018	13-Jan-2018	3
Clear Plastic Bottle - Natural							
D2		----	----	----	18-Jan-2018	13-Jan-2018	5
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural							
D1, GW05, BLNS-B1, A2S,	GW03, T4C, WQA02, A2	----	----	----	16-Jan-2018	13-Jan-2018	3
Clear Plastic Bottle - Natural							
D2		----	----	----	18-Jan-2018	13-Jan-2018	5
EP008: Chlorophyll a & Pheophytin a							
White Plastic Bottle - Unpreserved							
BLNS-B1, A2S,	WQA02, A2	----	----	----	18-Jan-2018	13-Jan-2018	5

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Total Kjeldahl Nitrogen as N By Discrete Analyser	3	33	9.09	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	1	31	3.23	10.00	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP) - Continued					
TRH Volatiles/BTEX	3	38	7.89	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	1	31	3.23	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) D2	11-Jan-2018	----	----	----	22-Jan-2018	10-Jul-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) D1, GW03, GW05, T4C, BLNS-B1, WQA02, A2S, A2	11-Jan-2018	----	----	----	17-Jan-2018	10-Jul-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1, WQA02, A2S, A2	11-Jan-2018	17-Jan-2018	10-Jul-2018	✓	17-Jan-2018	10-Jul-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) D1, GW03, GW05, T4C, BLNS-B1, WQA02, A2S, A2	11-Jan-2018	----	----	----	24-Jan-2018	10-Jul-2018	✓
Clear Plastic Bottle - Filtered; Lab-acidified (EG094B-F) D2	11-Jan-2018	----	----	----	24-Jan-2018	10-Jul-2018	✓
EG094T: Total metals in Fresh water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG094B-T) BLNS-B1, WQA02, A2S, A2	11-Jan-2018	24-Jan-2018	10-Jul-2018	✓	24-Jan-2018	10-Jul-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK055G: Ammonia as N by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK055G) D1, GW05, BLNS-B1, A2S, A2	GW03, T4C, WQA02, A2	11-Jan-2018	----	----	----	17-Jan-2018	08-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) D2		11-Jan-2018	----	----	----	19-Jan-2018	08-Feb-2018	✓
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) D1, GW05, BLNS-B1, A2S, A2	GW03, T4C, WQA02, A2	11-Jan-2018	----	----	----	16-Jan-2018	13-Jan-2018	*
Clear Plastic Bottle - Natural (EK057G) D2		11-Jan-2018	----	----	----	18-Jan-2018	13-Jan-2018	*
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) D1, GW05, BLNS-B1, A2S, A2	GW03, T4C, WQA02, A2	11-Jan-2018	----	----	----	17-Jan-2018	08-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) D2		11-Jan-2018	----	----	----	19-Jan-2018	08-Feb-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) D1, GW05, BLNS-B1, A2S, A2	GW03, T4C, WQA02, A2	11-Jan-2018	18-Jan-2018	08-Feb-2018	✓	18-Jan-2018	08-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) D2		11-Jan-2018	19-Jan-2018	08-Feb-2018	✓	19-Jan-2018	08-Feb-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) D1, GW05, BLNS-B1, A2S, A2	GW03, T4C, WQA02, A2	11-Jan-2018	18-Jan-2018	08-Feb-2018	✓	18-Jan-2018	08-Feb-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) D2		11-Jan-2018	19-Jan-2018	08-Feb-2018	✓	19-Jan-2018	08-Feb-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) D1, GW05, BLNS-B1, A2S, GW03, T4C, WQA02, A2	11-Jan-2018	----	----	----	16-Jan-2018	13-Jan-2018	*	
Clear Plastic Bottle - Natural (EK071G) D2	11-Jan-2018	----	----	----	18-Jan-2018	13-Jan-2018	*	
EP008: Chlorophyll a & Pheophytin a								
White Plastic Bottle - Unpreserved (EP008) BLNS-B1, A2S, WQA02, A2	11-Jan-2018	----	----	----	18-Jan-2018	13-Jan-2018	*	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) D1, GW05, BLNS-B1, A2S, GW03, T4C, WQA02, A2	11-Jan-2018	17-Jan-2018	18-Jan-2018	✓	18-Jan-2018	26-Feb-2018	✓	
Amber Glass Bottle - Unpreserved (EP071) D2	11-Jan-2018	18-Jan-2018	18-Jan-2018	✓	22-Jan-2018	27-Feb-2018	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D1, GW05, BLNS-B1, A2S, GW03, T4C, WQA02, A2	11-Jan-2018	17-Jan-2018	25-Jan-2018	✓	17-Jan-2018	25-Jan-2018	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D2	11-Jan-2018	22-Jan-2018	25-Jan-2018	✓	22-Jan-2018	25-Jan-2018	✓	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) D1, GW05, BLNS-B1, A2S, GW03, T4C, WQA02, A2	11-Jan-2018	17-Jan-2018	18-Jan-2018	✓	18-Jan-2018	26-Feb-2018	✓	
Amber Glass Bottle - Unpreserved (EP071) D2	11-Jan-2018	18-Jan-2018	18-Jan-2018	✓	22-Jan-2018	27-Feb-2018	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D1, GW05, BLNS-B1, A2S, GW03, T4C, WQA02, A2	11-Jan-2018	17-Jan-2018	25-Jan-2018	✓	17-Jan-2018	25-Jan-2018	✓	
Amber VOC Vial - Sulfuric Acid (EP080) D2	11-Jan-2018	22-Jan-2018	25-Jan-2018	✓	22-Jan-2018	25-Jan-2018	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) D1, GW05, BLNS-B1, A2S,	GW03, T4C, WQA02, A2	11-Jan-2018	17-Jan-2018	25-Jan-2018	✓	17-Jan-2018	25-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) D2		11-Jan-2018	22-Jan-2018	25-Jan-2018	✓	22-Jan-2018	25-Jan-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	4	36	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	4	35	11.43	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	3	33	9.09	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	31	3.23	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	3	38	7.89	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	31	6.45	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	36	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	33	6.06	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	31	3.23	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EM1801303	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Melbourne
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: Roe 8 Rehab	Date Samples Received	: 12-Jan-2018
Site	: ----	Issue Date	: 23-Jan-2018
Sampler	: ----	No. of samples received	: 7
Order number	: W81020-103	No. of samples analysed	: 7

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK067G: Total Phosphorus as P by Discrete Analyser	EB1801523--002	Anonymous	Total Phosphorus as P	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-F)							
T3B, BH10,	10-Jan-2018	----	----	----	17-Jan-2018	09-Jul-2018	✓
T4B, T3C,							
T2F, GW-D4,							
GW-T3E-A							
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-F)							
T3B, BH10,	10-Jan-2018	----	----	----	22-Jan-2018	09-Jul-2018	✓
T4B, T3C,							
T2F, GW-D4,							
GW-T3E-A							



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	----	----	----	15-Jan-2018	07-Feb-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	----	----	----	12-Jan-2018	12-Jan-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	----	----	----	16-Jan-2018	07-Feb-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	17-Jan-2018	07-Feb-2018	✓	17-Jan-2018	07-Feb-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	17-Jan-2018	07-Feb-2018	✓	17-Jan-2018	07-Feb-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) T3B, BH10, T4B, T3C, T2F, GW-D4, GW-T3E-A	10-Jan-2018	----	----	----	12-Jan-2018	12-Jan-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) T3B, T4B, T2F, GW-T3E-A	BH10, T3C, GW-D4,	10-Jan-2018	17-Jan-2018	17-Jan-2018	✓	18-Jan-2018	26-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T4B, T2F, GW-T3E-A	BH10, T3C, GW-D4,	10-Jan-2018	15-Jan-2018	24-Jan-2018	✓	15-Jan-2018	24-Jan-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) T3B, T4B, T2F, GW-T3E-A	BH10, T3C, GW-D4,	10-Jan-2018	17-Jan-2018	17-Jan-2018	✓	18-Jan-2018	26-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T4B, T2F, GW-T3E-A	BH10, T3C, GW-D4,	10-Jan-2018	15-Jan-2018	24-Jan-2018	✓	15-Jan-2018	24-Jan-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T4B, T2F, GW-T3E-A	BH10, T3C, GW-D4,	10-Jan-2018	15-Jan-2018	24-Jan-2018	✓	15-Jan-2018	24-Jan-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1713111	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Tim Williamson	Telephone	: 08 9209 7655
Project	: MRIA - R8 Rehab	Date Samples Received	: 21-Nov-2017
Site	: ----	Issue Date	: 28-Nov-2017
Sampler	: Rachel Champion	No. of samples received	: 8
Order number	: W81020-103	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatle Fraction	1	19	5.26	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	24-Nov-2017	19-May-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) T4C, BH12	21-Nov-2017	----	----	----	24-Nov-2017	20-May-2018	✓
EG094F: Dissolved Metals in Fresh Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	27-Nov-2017	19-May-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG094B-F) T4C, BH12	21-Nov-2017	----	----	----	27-Nov-2017	20-May-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	21-Nov-2017	18-Dec-2017	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) T4C, BH12	21-Nov-2017	----	----	----	21-Nov-2017	19-Dec-2017	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	21-Nov-2017	22-Nov-2017	✓	
Clear Plastic Bottle - Natural (EK057G) T4C, BH12	21-Nov-2017	----	----	----	21-Nov-2017	23-Nov-2017	✓	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	21-Nov-2017	18-Dec-2017	✓	
Clear Plastic Bottle - Sulfuric Acid (EK059G) T4C, BH12	21-Nov-2017	----	----	----	21-Nov-2017	19-Dec-2017	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	24-Nov-2017	18-Dec-2017	✓	24-Nov-2017	18-Dec-2017	✓	
Clear Plastic Bottle - Sulfuric Acid (EK061G) T4C, BH12	21-Nov-2017	24-Nov-2017	19-Dec-2017	✓	24-Nov-2017	19-Dec-2017	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	24-Nov-2017	18-Dec-2017	✓	24-Nov-2017	18-Dec-2017	✓	
Clear Plastic Bottle - Sulfuric Acid (EK067G) T4C, BH12	21-Nov-2017	24-Nov-2017	19-Dec-2017	✓	24-Nov-2017	19-Dec-2017	✓	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) BH10, T3C, GW-D7, GW-D8, WQA01_201117	20-Nov-2017	----	----	----	21-Nov-2017	22-Nov-2017	✓	
Clear Plastic Bottle - Natural (EK071G) T4C, BH12	21-Nov-2017	----	----	----	21-Nov-2017	23-Nov-2017	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) BH10, GW-D7, WQA01_201117	T3C, GW-D8,	20-Nov-2017	24-Nov-2017	27-Nov-2017	✓	27-Nov-2017	03-Jan-2018	✓
Amber Glass Bottle - Unpreserved (EP071) T4C,	BH12	21-Nov-2017	24-Nov-2017	28-Nov-2017	✓	27-Nov-2017	03-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH10, GW-D7, WQA01_201117,	T3C, GW-D8, WQA06_DB TBW 1133	20-Nov-2017	24-Nov-2017	04-Dec-2017	✓	24-Nov-2017	04-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C,	BH12	21-Nov-2017	24-Nov-2017	05-Dec-2017	✓	24-Nov-2017	05-Dec-2017	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) BH10, GW-D7, WQA01_201117	T3C, GW-D8,	20-Nov-2017	24-Nov-2017	27-Nov-2017	✓	27-Nov-2017	03-Jan-2018	✓
Amber Glass Bottle - Unpreserved (EP071) T4C,	BH12	21-Nov-2017	24-Nov-2017	28-Nov-2017	✓	27-Nov-2017	03-Jan-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH10, GW-D7, WQA01_201117,	T3C, GW-D8, WQA06_DB TBW 1133	20-Nov-2017	24-Nov-2017	04-Dec-2017	✓	24-Nov-2017	04-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C,	BH12	21-Nov-2017	24-Nov-2017	05-Dec-2017	✓	24-Nov-2017	05-Dec-2017	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) BH10, GW-D7, WQA01_201117,	T3C, GW-D8, WQA06_DB TBW 1133	20-Nov-2017	24-Nov-2017	04-Dec-2017	✓	24-Nov-2017	04-Dec-2017	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4C,	BH12	21-Nov-2017	24-Nov-2017	05-Dec-2017	✓	24-Nov-2017	05-Dec-2017	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Fresh Water -Suite B by ORC-ICPMS	EG094B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1802093	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 07-Feb-2018
Site	: ----	Issue Date	: 15-Feb-2018
Sampler	: Rachel Champion	No. of samples received	: 8
Order number	: W81020-103	No. of samples analysed	: 8

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP008: Chlorophyll a & Pheophytin a							
White Plastic Bottle - Unpreserved							
A1, A1E,	A1N, NLWS-N2	----	----	----	12-Feb-2018	09-Feb-2018	3

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	10	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	17	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	17	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
		Container / Client Sample ID(s)	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)								
GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	----	----	----	12-Feb-2018	05-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)								
A1, A1E,	A1N, NLWS-N2	07-Feb-2018	----	----	----	12-Feb-2018	06-Aug-2018	✓
EG020T: Total Metals by ICP-MS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)								
A1, A1E,	A1N, NLWS-N2	07-Feb-2018	12-Feb-2018	06-Aug-2018	✓	12-Feb-2018	06-Aug-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) GW-T3E-A, T2F, GW-D5, WQA01_060218	06-Feb-2018	----	----	----	12-Feb-2018	05-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) A1, A1E, A1N, NLWS-N2	07-Feb-2018	----	----	----	12-Feb-2018	06-Aug-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) A1, A1E, A1N, NLWS-N2	07-Feb-2018	12-Feb-2018	06-Aug-2018	✓	12-Feb-2018	06-Aug-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-T3E-A, T2F, GW-D5, WQA01_060218	06-Feb-2018	----	----	----	07-Feb-2018	06-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) A1, A1E, A1N, NLWS-N2	07-Feb-2018	----	----	----	07-Feb-2018	07-Mar-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-T3E-A, T2F, GW-D5, WQA01_060218	06-Feb-2018	----	----	----	07-Feb-2018	08-Feb-2018	✓
Clear Plastic Bottle - Natural (EK057G) A1, A1E, A1N, NLWS-N2	07-Feb-2018	----	----	----	07-Feb-2018	09-Feb-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-T3E-A, T2F, GW-D5, WQA01_060218	06-Feb-2018	----	----	----	07-Feb-2018	06-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) A1, A1E, A1N, NLWS-N2	07-Feb-2018	----	----	----	07-Feb-2018	07-Mar-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-T3E-A, T2F, GW-D5, WQA01_060218	06-Feb-2018	09-Feb-2018	06-Mar-2018	✓	12-Feb-2018	06-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) A1, A1E, A1N, NLWS-N2	07-Feb-2018	09-Feb-2018	07-Mar-2018	✓	12-Feb-2018	07-Mar-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	09-Feb-2018	06-Mar-2018	✓	12-Feb-2018	06-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) A1, A1E,	A1N, NLWS-N2	07-Feb-2018	09-Feb-2018	07-Mar-2018	✓	12-Feb-2018	07-Mar-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	----	----	----	07-Feb-2018	08-Feb-2018	✓
Clear Plastic Bottle - Natural (EK071G) A1, A1E,	A1N, NLWS-N2	07-Feb-2018	----	----	----	07-Feb-2018	09-Feb-2018	✓
EP008: Chlorophyll a & Pheophytin a								
White Plastic Bottle - Unpreserved (EP008) A1, A1E,	A1N, NLWS-N2	07-Feb-2018	----	----	----	12-Feb-2018	09-Feb-2018	*
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	08-Feb-2018	13-Feb-2018	✓	09-Feb-2018	20-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) A1, A1E,	A1N, NLWS-N2	07-Feb-2018	08-Feb-2018	14-Feb-2018	✓	09-Feb-2018	20-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	13-Feb-2018	20-Feb-2018	✓	14-Feb-2018	20-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A1, A1E,	A1N, NLWS-N2	07-Feb-2018	13-Feb-2018	21-Feb-2018	✓	14-Feb-2018	21-Feb-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	08-Feb-2018	13-Feb-2018	✓	09-Feb-2018	20-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071)								
A1, A1E,	A1N, NLWS-N2	07-Feb-2018	08-Feb-2018	14-Feb-2018	✓	09-Feb-2018	20-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	13-Feb-2018	20-Feb-2018	✓	14-Feb-2018	20-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E,	A1N, NLWS-N2	07-Feb-2018	13-Feb-2018	21-Feb-2018	✓	14-Feb-2018	21-Feb-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, T2F,	GW-D5, WQA01_060218	06-Feb-2018	13-Feb-2018	20-Feb-2018	✓	14-Feb-2018	20-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
A1, A1E,	A1N, NLWS-N2	07-Feb-2018	13-Feb-2018	21-Feb-2018	✓	14-Feb-2018	21-Feb-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	10	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	3	17	17.65	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	4	25.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	0	17	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	17	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1802224	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 09-Feb-2018
Site	: ----	Issue Date	: 19-Feb-2018
Sampler	: Rachel Champion	No. of samples received	: 10
Order number	: W81020-103	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	20	5.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) A2, BLNS-B1, WQA02_080218	08-Feb-2018	----	----	----	14-Feb-2018	07-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BH12, GW-D4	09-Feb-2018	----	----	----	14-Feb-2018	08-Aug-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) A2, BLNS-B1, WQA03_080218	08-Feb-2018	14-Feb-2018	07-Aug-2018	✓	14-Feb-2018	07-Aug-2018	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_090218	09-Feb-2018	14-Feb-2018	08-Aug-2018	✓	14-Feb-2018	08-Aug-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) A2, BLNS-B1, WQA02_080218	08-Feb-2018	----	----	----	14-Feb-2018	07-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) BH12, GW-D4	09-Feb-2018	----	----	----	14-Feb-2018	08-Aug-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-T) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218, 08-Feb-2018	14-Feb-2018	07-Aug-2018	✓	14-Feb-2018	07-Aug-2018	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-T) WQA03_090218	09-Feb-2018	14-Feb-2018	08-Aug-2018	✓	14-Feb-2018	08-Aug-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) A2, BLNS-B1,	A2S, WQA02_080218, 08-Feb-2018	----	----	----	09-Feb-2018	08-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) BH12, GW-D4	GW-D3, 09-Feb-2018	----	----	----	09-Feb-2018	09-Mar-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) A2, BLNS-B1,	A2S, WQA02_080218, 08-Feb-2018	----	----	----	09-Feb-2018	10-Feb-2018	✓
Clear Plastic Bottle - Natural (EK057G) BH12, GW-D4	GW-D3, 09-Feb-2018	----	----	----	09-Feb-2018	11-Feb-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) A2, BLNS-B1,	A2S, WQA02_080218, 08-Feb-2018	----	----	----	09-Feb-2018	08-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) BH12, GW-D4	GW-D3, 09-Feb-2018	----	----	----	09-Feb-2018	09-Mar-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) A2, BLNS-B1,	A2S, WQA02_080218, 08-Feb-2018	13-Feb-2018	08-Mar-2018	✓	16-Feb-2018	08-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) BH12, GW-D4	GW-D3, 09-Feb-2018	13-Feb-2018	09-Mar-2018	✓	16-Feb-2018	09-Mar-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) A2, BLNS-B1,	A2S, WQA02_080218, 08-Feb-2018	13-Feb-2018	08-Mar-2018	✓	16-Feb-2018	08-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) BH12, GW-D4	GW-D3, 09-Feb-2018	13-Feb-2018	09-Mar-2018	✓	16-Feb-2018	09-Mar-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) A2, BLNS-B1,	A2S, WQA02_080218	08-Feb-2018	----	----	----	09-Feb-2018	10-Feb-2018	✓
Clear Plastic Bottle - Natural (EK071G) BH12, GW-D4	GW-D3,	09-Feb-2018	----	----	----	09-Feb-2018	11-Feb-2018	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) A2, BLNS-B1,	A2S, WQA02_080218	08-Feb-2018	----	----	----	12-Feb-2018	01-Mar-2018	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218,	08-Feb-2018	13-Feb-2018	15-Feb-2018	✓	15-Feb-2018	25-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D4,	GW-D3, WQA03_090218	09-Feb-2018	13-Feb-2018	16-Feb-2018	✓	15-Feb-2018	25-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218,	08-Feb-2018	15-Feb-2018	22-Feb-2018	✓	17-Feb-2018	22-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D4, WQA03_090218	GW-D3, WQA04_DB TBW 999,	09-Feb-2018	15-Feb-2018	23-Feb-2018	✓	17-Feb-2018	23-Feb-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218,	08-Feb-2018	13-Feb-2018	15-Feb-2018	✓	15-Feb-2018	25-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) BH12, GW-D4,	GW-D3, WQA03_090218	09-Feb-2018	13-Feb-2018	16-Feb-2018	✓	15-Feb-2018	25-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218,	08-Feb-2018	15-Feb-2018	22-Feb-2018	✓	17-Feb-2018	22-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D4, WQA03_090218	GW-D3, WQA04_DB TBW 999,	09-Feb-2018	15-Feb-2018	23-Feb-2018	✓	17-Feb-2018	23-Feb-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) A2, BLNS-B1, WQA03_080218	A2S, WQA02_080218,	08-Feb-2018	15-Feb-2018	22-Feb-2018	✓	17-Feb-2018	22-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BH12, GW-D4, WQA03_090218	GW-D3, WQA04_DB TBW 999,	09-Feb-2018	15-Feb-2018	23-Feb-2018	✓	17-Feb-2018	23-Feb-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	4	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1802359	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9209 7655
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 13-Feb-2018
Site	: ----	Issue Date	: 20-Feb-2018
Sampler	: Rachel Champion	No. of samples received	: 10
Order number	: W81020-103	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Total Kjeldahl Nitrogen as N By Discrete Analyser	1	13	7.69	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	20	5.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) GW-D8	12-Feb-2018	----	----	----	16-Feb-2018	11-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	16-Feb-2018	12-Aug-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) WQA03_130218	13-Feb-2018	16-Feb-2018	12-Aug-2018	✓	16-Feb-2018	12-Aug-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) GW-D8	12-Feb-2018	----	----	----	16-Feb-2018	11-Aug-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	16-Feb-2018	12-Aug-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) WQA03_130218	13-Feb-2018	16-Feb-2018	12-Aug-2018	✓	16-Feb-2018	12-Aug-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D8	12-Feb-2018	----	----	----	13-Feb-2018	12-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	13-Feb-2018	13-Mar-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D8	12-Feb-2018	----	----	----	13-Feb-2018	14-Feb-2018	✓
Clear Plastic Bottle - Natural (EK057G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	13-Feb-2018	15-Feb-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D8	12-Feb-2018	----	----	----	13-Feb-2018	12-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	13-Feb-2018	13-Mar-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D8	12-Feb-2018	16-Feb-2018	12-Mar-2018	✓	19-Feb-2018	12-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	16-Feb-2018	13-Mar-2018	✓	19-Feb-2018	13-Mar-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D8	12-Feb-2018	16-Feb-2018	12-Mar-2018	✓	19-Feb-2018	12-Mar-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	16-Feb-2018	13-Mar-2018	✓	19-Feb-2018	13-Mar-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D8	12-Feb-2018	----	----	----	13-Feb-2018	14-Feb-2018	✓
Clear Plastic Bottle - Natural (EK071G) T3B, T3C, T4B, T4C, D1, D2, BH10	13-Feb-2018	----	----	----	13-Feb-2018	15-Feb-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) GW-D8	12-Feb-2018	16-Feb-2018	19-Feb-2018	✓	19-Feb-2018	28-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) T3B, T3C, T4B, T4C, D1, D2, WQA03_130218, BH10	13-Feb-2018	16-Feb-2018	20-Feb-2018	✓	19-Feb-2018	28-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8	12-Feb-2018	19-Feb-2018	26-Feb-2018	✓	19-Feb-2018	26-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T3C, T4B, T4C, D1, D2, WQA05_DB TBW 998, WQA03_130218, BH10	13-Feb-2018	19-Feb-2018	27-Feb-2018	✓	19-Feb-2018	27-Feb-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) GW-D8	12-Feb-2018	16-Feb-2018	19-Feb-2018	✓	19-Feb-2018	28-Mar-2018	✓
Amber Glass Bottle - Unpreserved (EP071) T3B, T3C, T4B, T4C, D1, D2, WQA03_130218, BH10	13-Feb-2018	16-Feb-2018	20-Feb-2018	✓	19-Feb-2018	28-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8	12-Feb-2018	19-Feb-2018	26-Feb-2018	✓	19-Feb-2018	26-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T3C, T4B, T4C, D1, D2, WQA05_DB TBW 998, WQA03_130218, BH10	13-Feb-2018	19-Feb-2018	27-Feb-2018	✓	19-Feb-2018	27-Feb-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8	12-Feb-2018	19-Feb-2018	26-Feb-2018	✓	19-Feb-2018	26-Feb-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B, T3C, T4B, T4C, D1, D2, WQA05_DB TBW 998, BH10	13-Feb-2018	19-Feb-2018	27-Feb-2018	✓	19-Feb-2018	27-Feb-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	7.69	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	3	28	10.71	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	28	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1804348	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 04-Apr-2018
Site	: ----	Issue Date	: 13-Apr-2018
Sampler	: Rachel Champion	No. of samples received	: 14
Order number	: W81020-103	No. of samples analysed	: 14

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO Method Blank value outliers occur.**
- **NO Duplicate outliers occur.**
- **NO Laboratory Control outliers occur.**
- **NO Matrix Spike outliers occur.**
- **For all regular sample matrices, NO surrogate recovery outliers occur.**

Outliers : Analysis Holding Time Compliance

- **NO Analysis Holding Time Outliers exist.**

Outliers : Frequency of Quality Control Samples

- **Quality Control Sample Frequency Outliers exist - please see following pages for full details.**



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	9	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	10-Apr-2018	01-Oct-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) WQA03_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	10-Apr-2018	01-Oct-2018	✓	10-Apr-2018	01-Oct-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	09-Apr-2018	01-Oct-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) WQA03_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	01-Oct-2018	✓	09-Apr-2018	01-Oct-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	12-Apr-2018	02-May-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	04-Apr-2018	06-Apr-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	12-Apr-2018	02-May-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	11-Apr-2018	02-May-2018	✓	11-Apr-2018	02-May-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	11-Apr-2018	02-May-2018	✓	11-Apr-2018	02-May-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	04-Apr-2018	06-Apr-2018	✓
EP008: Chlorophyll a & Pheophytin a							
Glass Fibre Filter Paper (Chlorophyll) (EP008) BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	----	----	----	09-Apr-2018	25-Apr-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP080) WQA03_040418	04-Apr-2018	09-Apr-2018	11-Apr-2018	✓	09-Apr-2018	11-Apr-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	11-Apr-2018	✓	10-Apr-2018	19-May-2018	✓
Amber Glass Bottle - Unpreserved (EP071) WQA03_040418	04-Apr-2018	10-Apr-2018	11-Apr-2018	✓	10-Apr-2018	20-May-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA05_DB TBW 404, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	18-Apr-2018	✓	09-Apr-2018	18-Apr-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP080) WQA03_040418	04-Apr-2018	09-Apr-2018	11-Apr-2018	✓	09-Apr-2018	11-Apr-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	11-Apr-2018	✓	10-Apr-2018	19-May-2018	✓
Amber Glass Bottle - Unpreserved (EP071) WQA03_040418	04-Apr-2018	10-Apr-2018	11-Apr-2018	✓	10-Apr-2018	20-May-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA05_DB TBW 404, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	18-Apr-2018	✓	09-Apr-2018	18-Apr-2018	✓
EP080: BTEXN							
Amber Glass Bottle - Unpreserved (EP080) WQA03_040418	04-Apr-2018	09-Apr-2018	11-Apr-2018	✓	09-Apr-2018	11-Apr-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-T3E-A, T2F, GW-D5, GW-D8, BH12, D1, D2, WQA05_DB TBW 404, WQA01_040418, BLNS-B1, A2, A2S, WAQ02_040418	04-Apr-2018	09-Apr-2018	18-Apr-2018	✓	09-Apr-2018	18-Apr-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	9	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	0	13	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1803361	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 09-Mar-2018
Site	: ----	Issue Date	: 16-Mar-2018
Sampler	: Rachel Champion	No. of samples received	: 10
Order number	: W81020-103	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP008: Chlorophyll a & Pheophytin a						
White Plastic Bottle - Unpreserved						
NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	----	----	----	12-Mar-2018	11-Mar-2018	1

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	----	----	----	14-Mar-2018	05-Sep-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)							
NLWS-N2, A2S, BLNS-B1, A2, WQA03_090318, WQA02_090318	09-Mar-2018	14-Mar-2018	05-Sep-2018	✓	14-Mar-2018	05-Sep-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	----	----	----	14-Mar-2018	05-Sep-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) NLWS-N2, A2S, BLNS-B1, A2, WQA03_090318, WQA02_090318	09-Mar-2018	14-Mar-2018	05-Sep-2018	✓	14-Mar-2018	05-Sep-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	----	----	----	09-Mar-2018	06-Apr-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	----	----	----	09-Mar-2018	11-Mar-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	----	----	----	09-Mar-2018	06-Apr-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	15-Mar-2018	06-Apr-2018	✓	15-Mar-2018	06-Apr-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) T3B, T3C, BH10, NLWS-N2, A2S, BLNS-B1, A2, WQA02_090318	09-Mar-2018	15-Mar-2018	06-Apr-2018	✓	15-Mar-2018	06-Apr-2018	✓



Matrix: WATER

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) T3B, BH10, A2S, A2, T3C, NLWS-N2, BLNS-B1, WQA02_090318	09-Mar-2018	----	----	----	09-Mar-2018	11-Mar-2018	✔	
EP008: Chlorophyll a & Pheophytin a								
White Plastic Bottle - Unpreserved (EP008) NLWS-N2, BLNS-B1, WQA02_090318	09-Mar-2018	----	----	----	12-Mar-2018	11-Mar-2018	✖	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) T3B, BH10, A2S, T3C, NLWS-N2, BLNS-B1	09-Mar-2018	13-Mar-2018	16-Mar-2018	✔	14-Mar-2018	22-Apr-2018	✔	
Amber Glass Bottle - Unpreserved (EP071) A2, WQA02_090318	09-Mar-2018	14-Mar-2018	16-Mar-2018	✔	14-Mar-2018	23-Apr-2018	✔	
Amber VOC Vial - Sulfuric Acid (EP080) T3B, BH10, A2S, A2, WQA03_090318, T3C, NLWS-N2, BLNS-B1, WQA05_TBW119, WQA02_090318	09-Mar-2018	12-Mar-2018	23-Mar-2018	✔	12-Mar-2018	23-Mar-2018	✔	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) T3B, BH10, A2S, T3C, NLWS-N2, BLNS-B1	09-Mar-2018	13-Mar-2018	16-Mar-2018	✔	14-Mar-2018	22-Apr-2018	✔	
Amber Glass Bottle - Unpreserved (EP071) A2, WQA02_090318	09-Mar-2018	14-Mar-2018	16-Mar-2018	✔	14-Mar-2018	23-Apr-2018	✔	
Amber VOC Vial - Sulfuric Acid (EP080) T3B, BH10, A2S, A2, WQA03_090318, T3C, NLWS-N2, BLNS-B1, WQA05_TBW119, WQA02_090318	09-Mar-2018	12-Mar-2018	23-Mar-2018	✔	12-Mar-2018	23-Mar-2018	✔	

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 Work Order : EP1803361
 Client : MRIA
 Project : MRIA (Roe 8 Rehab)



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
T3B, BH10, A2S, A2, WQA03_090318,	T3C, NLWS-N2, BLNS-B1, WQA05_TBW119, WQA02_090318	09-Mar-2018	12-Mar-2018	23-Mar-2018	✓	12-Mar-2018	23-Mar-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	5	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	40	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	6	16.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	40	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1803480	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 13-Mar-2018
Site	: ----	Issue Date	: 20-Mar-2018
Sampler	: Rachel Champion	No. of samples received	: 4
Order number	: W181020-103	No. of samples analysed	: 4

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1803480--001	GW-D4	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	13	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	13	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) GW-D4	12-Mar-2018	----	----	----	16-Mar-2018	08-Sep-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) GW-D8, BH12	13-Mar-2018	----	----	----	16-Mar-2018	09-Sep-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) GW-D4	12-Mar-2018	----	----	----	16-Mar-2018	08-Sep-2018	✓
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) GW-D8, BH12	13-Mar-2018	----	----	----	16-Mar-2018	09-Sep-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D4	12-Mar-2018	----	----	----	13-Mar-2018	09-Apr-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D8, BH12	13-Mar-2018	----	----	----	13-Mar-2018	10-Apr-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D4	12-Mar-2018	----	----	----	13-Mar-2018	14-Mar-2018	✓
Clear Plastic Bottle - Natural (EK057G) GW-D8, BH12	13-Mar-2018	----	----	----	13-Mar-2018	15-Mar-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D4	12-Mar-2018	----	----	----	13-Mar-2018	09-Apr-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D8, BH12	13-Mar-2018	----	----	----	13-Mar-2018	10-Apr-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D4	12-Mar-2018	16-Mar-2018	09-Apr-2018	✓	16-Mar-2018	09-Apr-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D8, BH12	13-Mar-2018	16-Mar-2018	10-Apr-2018	✓	16-Mar-2018	10-Apr-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D4	12-Mar-2018	16-Mar-2018	09-Apr-2018	✓	16-Mar-2018	09-Apr-2018	✓
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D8, BH12	13-Mar-2018	16-Mar-2018	10-Apr-2018	✓	16-Mar-2018	10-Apr-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D4	12-Mar-2018	----	----	----	13-Mar-2018	14-Mar-2018	✓
Clear Plastic Bottle - Natural (EK071G) GW-D8, BH12	13-Mar-2018	----	----	----	13-Mar-2018	15-Mar-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) GW-D4	12-Mar-2018	15-Mar-2018	19-Mar-2018	✓	16-Mar-2018	24-Apr-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D8, BH12	13-Mar-2018	15-Mar-2018	20-Mar-2018	✓	16-Mar-2018	24-Apr-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4	12-Mar-2018	14-Mar-2018	26-Mar-2018	✓	14-Mar-2018	26-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8, BH12, WQA04_TBW118	13-Mar-2018	14-Mar-2018	27-Mar-2018	✓	14-Mar-2018	27-Mar-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions							
Amber Glass Bottle - Unpreserved (EP071) GW-D4	12-Mar-2018	15-Mar-2018	19-Mar-2018	✓	16-Mar-2018	24-Apr-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D8, BH12	13-Mar-2018	15-Mar-2018	20-Mar-2018	✓	16-Mar-2018	24-Apr-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4	12-Mar-2018	14-Mar-2018	26-Mar-2018	✓	14-Mar-2018	26-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8, BH12, WQA04_TBW118	13-Mar-2018	14-Mar-2018	27-Mar-2018	✓	14-Mar-2018	27-Mar-2018	✓
EP080: BTEXN							
Amber VOC Vial - Sulfuric Acid (EP080) GW-D4	12-Mar-2018	14-Mar-2018	26-Mar-2018	✓	14-Mar-2018	26-Mar-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D8, BH12, WQA04_TBW118	13-Mar-2018	14-Mar-2018	27-Mar-2018	✓	14-Mar-2018	27-Mar-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	13	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1803299	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 08-Mar-2018
Site	: ----	Issue Date	: 16-Mar-2018
Sampler	: Rachel Champion	No. of samples received	: 11
Order number	: W81020-103	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EG020T: Total Metals by ICP-MS	ES1807288--001	Anonymous	Manganese	7439-96-5	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	1	17	5.88	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EG020F: Dissolved Metals by ICP-MS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)								
GW-T3E-A, GW-D5, T4C, D2, T2F	GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	13-Mar-2018	04-Sep-2018	✓
EG020T: Total Metals by ICP-MS								
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)								
WQA03_080318		08-Mar-2018	12-Mar-2018	04-Sep-2018	✓	12-Mar-2018	04-Sep-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS								
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F)								
GW-T3E-A, GW-D5, T4C, D2, T2F	GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	12-Mar-2018	04-Sep-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) WQA03_080318	08-Mar-2018	12-Mar-2018	04-Sep-2018	✓	12-Mar-2018	04-Sep-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-T3E-A, GW-D5, T4C, D2, T2F GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	08-Mar-2018	05-Apr-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-T3E-A, GW-D5, T4C, D2, T2F GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	08-Mar-2018	10-Mar-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-T3E-A, GW-D5, T4C, D2, T2F GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	08-Mar-2018	05-Apr-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-T3E-A, GW-D5, T4C, D2, T2F GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	15-Mar-2018	05-Apr-2018	✓	15-Mar-2018	05-Apr-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-T3E-A, GW-D5, T4C, D2, T2F GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	15-Mar-2018	05-Apr-2018	✓	15-Mar-2018	05-Apr-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G)								
GW-T3E-A, GW-D5, T4C, D2, T2F	GW-D3, T4B, D1, WQA01_080318,	08-Mar-2018	----	----	----	08-Mar-2018	10-Mar-2018	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
GW-T3E-A, GW-D5, T4C, D2, WQA01_080318,	GW-D3, T4B, D1, WQA03_080318, T2F	08-Mar-2018	12-Mar-2018	15-Mar-2018	✓	12-Mar-2018	21-Apr-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, GW-D5, T4C, D2, WQA03_080318, T2F	GW-D3, T4B, D1, WQA04_TBW 117, WQA01_080318,	08-Mar-2018	09-Mar-2018	22-Mar-2018	✓	09-Mar-2018	22-Mar-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-T3E-A, GW-D5, T4C, D2, WQA01_080318,	GW-D3, T4B, D1, WQA03_080318, T2F	08-Mar-2018	12-Mar-2018	15-Mar-2018	✓	12-Mar-2018	21-Apr-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, GW-D5, T4C, D2, WQA03_080318, T2F	GW-D3, T4B, D1, WQA04_TBW 117, WQA01_080318,	08-Mar-2018	09-Mar-2018	22-Mar-2018	✓	09-Mar-2018	22-Mar-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-T3E-A, GW-D5, T4C, D2, WQA03_080318, T2F	GW-D3, T4B, D1, WQA04_TBW 117, WQA01_080318,	08-Mar-2018	09-Mar-2018	22-Mar-2018	✓	09-Mar-2018	22-Mar-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	3	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	3	33.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	17	5.88	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1804292	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 03-Apr-2018
Site	: ----	Issue Date	: 11-Apr-2018
Sampler	: Rachel Champion	No. of samples received	: 9
Order number	: W81020-103	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	14	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F)							
GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	09-Apr-2018	30-Sep-2018	✔
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T)							
WQA03_030418	03-Apr-2018	09-Apr-2018	30-Sep-2018	✔	09-Apr-2018	30-Sep-2018	✔
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F)							
GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	06-Apr-2018	30-Sep-2018	✔
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T)							
WQA03_030418	03-Apr-2018	06-Apr-2018	30-Sep-2018	✔	06-Apr-2018	30-Sep-2018	✔
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G)							
GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	11-Apr-2018	01-May-2018	✔



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	03-Apr-2018	05-Apr-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	11-Apr-2018	01-May-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	11-Apr-2018	01-May-2018	✓	11-Apr-2018	01-May-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	11-Apr-2018	01-May-2018	✓	11-Apr-2018	01-May-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B	03-Apr-2018	----	----	----	03-Apr-2018	05-Apr-2018	✓
EP080/071: Total Petroleum Hydrocarbons							
Amber Glass Bottle - Unpreserved (EP071) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B, WQA03_030418	03-Apr-2018	05-Apr-2018	10-Apr-2018	✓	09-Apr-2018	15-May-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3, GW-D4, BH10, T3B, T3C, T4C, T4B, WQA03_030418, WQA04_DB TBW 246	03-Apr-2018	09-Apr-2018	17-Apr-2018	✓	09-Apr-2018	17-Apr-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D3, BH10, T3C, T4B,	GW-D4, T3B, T4C, WQA03_030418	03-Apr-2018	05-Apr-2018	10-Apr-2018	✓	09-Apr-2018	15-May-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3, BH10, T3C, T4B, WQA04_DB TBW 246	GW-D4, T3B, T4C, WQA03_030418,	03-Apr-2018	09-Apr-2018	17-Apr-2018	✓	09-Apr-2018	17-Apr-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D3, BH10, T3C, T4B, WQA04_DB TBW 246	GW-D4, T3B, T4C, WQA03_030418,	03-Apr-2018	09-Apr-2018	17-Apr-2018	✓	09-Apr-2018	17-Apr-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	14	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1805453	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 02-May-2018
Site	: ----	Issue Date	: 10-May-2018
Sampler	: Danielle Sullivan	No. of samples received	: 11
Order number	: W81020-103	No. of samples analysed	: 11

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EP080/071: Total Petroleum Hydrocarbons	EP1805422--002	Anonymous	C6 - C9 Fraction	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080/071: Total Recoverable Hydrocarbons - NEPM 2	EP1805422--002	Anonymous	C6 - C10 Fraction	C6_C10	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEXN	EP1805422--002	Anonymous	Benzene	71-43-2	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EP080: BTEXN	EP1805422--002	Anonymous	Toluene	108-88-3	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	5	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	28	3.57	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	1	28	3.57	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BLNS-B1_020518, A2_020518, A2S_020518, BH12_020518, GW-D3_020518, GW-D4_020518, GW-D8_020518, WQA01_020518, D2_020518, D1_020518	02-May-2018	----	----	----	08-May-2018	29-Oct-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_020518, A2_020518, A2S_020518, WQA01_020518	02-May-2018	07-May-2018	29-Oct-2018	✓	07-May-2018	29-Oct-2018	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA02_020518	02-May-2018	07-May-2018	29-Oct-2018	✓	07-May-2018	29-Oct-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) BLNS-B1_020518, A2_020518, A2S_020518, BH12_020518, GW-D3_020518, GW-D4_020518, GW-D8_020518, WQA01_020518, D2_020518, D1_020518	02-May-2018	----	----	----	07-May-2018	29-Oct-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) BLNS-B1_020518, A2_020518, A2S_020518, WQA01_020518	02-May-2018	07-May-2018	29-Oct-2018	✓	07-May-2018	29-Oct-2018	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-T) WQA02_020518	02-May-2018	07-May-2018	29-Oct-2018	✓	07-May-2018	29-Oct-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BLNS-B1_020518, A2_020518, A2S_020518, BH12_020518, GW-D3_020518, GW-D4_020518, GW-D8_020518, WQA01_020518, D2_020518, D1_020518	02-May-2018	----	----	----	02-May-2018	30-May-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BLNS-B1_020518, A2_020518, A2S_020518, BH12_020518, GW-D3_020518, GW-D4_020518, GW-D8_020518, WQA01_020518, D2_020518, D1_020518	02-May-2018	----	----	----	02-May-2018	04-May-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518, A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	----	----	----	02-May-2018	30-May-2018	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518, A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	09-May-2018	30-May-2018	✓	09-May-2018	30-May-2018	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518, A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	09-May-2018	30-May-2018	✓	09-May-2018	30-May-2018	✓	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518, A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	----	----	----	02-May-2018	04-May-2018	✓	
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) BLNS-B1_020518, A2S_020518, WQA01_020518	02-May-2018	----	----	----	07-May-2018	23-May-2018	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP080) WQA02_020518	02-May-2018	07-May-2018	09-May-2018	✓	07-May-2018	09-May-2018	✓	
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_020518, A2S_020518,	A2_020518, BH12_020518	02-May-2018	07-May-2018	09-May-2018	✓	08-May-2018	16-Jun-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D3_020518, GW-D8_020518, WQA02_020518, D1_020518	GW-D4_020518, WQA01_020518, D2_020518,	02-May-2018	08-May-2018	09-May-2018	✓	08-May-2018	17-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518,	A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	09-May-2018	16-May-2018	✓	09-May-2018	16-May-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP080) WQA02_020518	02-May-2018	07-May-2018	09-May-2018	✓	07-May-2018	09-May-2018	✓	
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_020518, A2S_020518,	A2_020518, BH12_020518	02-May-2018	07-May-2018	09-May-2018	✓	08-May-2018	16-Jun-2018	✓
Amber Glass Bottle - Unpreserved (EP071) GW-D3_020518, GW-D8_020518, WQA02_020518, D1_020518	GW-D4_020518, WQA01_020518, D2_020518,	02-May-2018	08-May-2018	09-May-2018	✓	08-May-2018	17-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518,	A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	09-May-2018	16-May-2018	✓	09-May-2018	16-May-2018	✓
EP080: BTEXN								
Amber Glass Bottle - Unpreserved (EP080) WQA02_020518	02-May-2018	07-May-2018	09-May-2018	✓	07-May-2018	09-May-2018	✓	
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_020518, A2S_020518, GW-D3_020518, GW-D8_020518, D2_020518,	A2_020518, BH12_020518, GW-D4_020518, WQA01_020518, D1_020518	02-May-2018	09-May-2018	16-May-2018	✓	09-May-2018	16-May-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	5	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	39	10.26	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	28	3.57	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	2	28	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	39	5.13	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	28	3.57	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1805524	Page	: 1 of 11
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 03-May-2018
Site	: ----	Issue Date	: 14-May-2018
Sampler	: Danielle Sullivan	No. of samples received	: 10
Order number	: W81020-103	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA	EP1805520--001	Anonymous	Sulfate as SO4 - Turbidimetric	14808-79-8	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
ED045G: Chloride by Discrete Analyser	EP1805520--001	Anonymous	Chloride	16887-00-6	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural KA_030518	----	----	----	08-May-2018	03-May-2018	5

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) KA_030518	03-May-2018	----	----	----	08-May-2018	03-May-2018	✖
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) KA_030518	03-May-2018	----	----	----	08-May-2018	31-May-2018	✔
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) KA_030518	03-May-2018	----	----	----	09-May-2018	10-May-2018	✔
EA041: Colour (True)							
Clear Plastic Bottle - Natural (EA041) KA_030518	03-May-2018	----	----	----	03-May-2018	05-May-2018	✔



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA075: Redox Potential							
Clear Plastic Bottle - Natural (EA075) KA_030518	03-May-2018	----	----	----	03-May-2018	03-May-2018	✓
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) KA_030518	03-May-2018	----	----	----	08-May-2018	17-May-2018	✓
ED038A: Acidity							
Clear Plastic Bottle - Natural (ED038) KA_030518	03-May-2018	----	----	----	08-May-2018	17-May-2018	✓
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) KA_030518	03-May-2018	----	----	----	11-May-2018	31-May-2018	✓
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) KA_030518	03-May-2018	----	----	----	11-May-2018	31-May-2018	✓
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) KA_030518	03-May-2018	----	----	----	09-May-2018	10-May-2018	✓
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	09-May-2018	30-Oct-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) WQA03_030518	03-May-2018	09-May-2018	30-Oct-2018	✓	09-May-2018	30-Oct-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	09-May-2018	30-Oct-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) WQA03_030518	03-May-2018	09-May-2018	30-Oct-2018	✓	09-May-2018	30-Oct-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	03-May-2018	31-May-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK057G: Nitrite as N by Discrete Analyser								
Clear Plastic Bottle - Natural (EK057G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	03-May-2018	05-May-2018	✓	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	03-May-2018	31-May-2018	✓	
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	10-May-2018	31-May-2018	✓	10-May-2018	31-May-2018	✓	
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	10-May-2018	31-May-2018	✓	10-May-2018	31-May-2018	✓	
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) T3B_030518, T4B_030518, T3C_030518, T4C_030518, GW-D5_030518, GW-T3E-A_030518, WQA01_030518, BH10_030518	03-May-2018	----	----	----	03-May-2018	05-May-2018	✓	
EP025: Oxygen - Dissolved (DO)								
Clear Plastic Bottle - Natural (EP025) KA_030518	03-May-2018	----	----	----	03-May-2018	03-May-2018	✓	



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) T3B_030518, T3C_030518, GW-D5_030518, WQA01_030518, BH10_030518	T4B_030518, T4C_030518, GW-T3E-A_030518, WQA03_030518,	03-May-2018	09-May-2018	10-May-2018	✓	10-May-2018	18-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B_030518, T3C_030518, GW-D5_030518, WQA01_030518, BH10_030518	T4B_030518, T4C_030518, GW-T3E-A_030518, WQA03_030518,	03-May-2018	10-May-2018	17-May-2018	✓	10-May-2018	17-May-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) T3B_030518, T3C_030518, GW-D5_030518, WQA01_030518, BH10_030518	T4B_030518, T4C_030518, GW-T3E-A_030518, WQA03_030518,	03-May-2018	09-May-2018	10-May-2018	✓	10-May-2018	18-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T3B_030518, T3C_030518, GW-D5_030518, WQA01_030518, BH10_030518	T4B_030518, T4C_030518, GW-T3E-A_030518, WQA03_030518,	03-May-2018	10-May-2018	17-May-2018	✓	10-May-2018	17-May-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) T3B_030518, T3C_030518, GW-D5_030518, WQA01_030518, BH10_030518	T4B_030518, T4C_030518, GW-T3E-A_030518, WQA03_030518,	03-May-2018	10-May-2018	17-May-2018	✓	10-May-2018	17-May-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Acidity as Calcium Carbonate	ED038	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity by PC Titrator	ED037-P	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Colour (True)	EA041	1	5	20.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	12	16.67	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	15	13.33	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Oxygen - Dissolved	EP025	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Redox Potential	EA075	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	8	25.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	11.11	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Acidity as Calcium Carbonate	ED038	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Alkalinity by PC Titrator	ED037-P	2	11	18.18	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Colour (True)	EA041	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	10.00	10.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Control Samples (LCS) - Continued							
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	13	15.38	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	16	12.50	10.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by PC Titrator	ED037-P	1	11	9.09	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Colour (True)	EA041	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	12	8.33	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	1	100.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	13	7.69	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
<i>Analytical Methods</i>							
Matrix Spikes (MS) - Continued							
TRH - Semivolatile Fraction	EP071	1	10	10.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Colour (True)	EA041	WATER	In house: Referenced to APHA 2120 B. This method is compliant with NEPM (2013) Schedule B(3)
Redox Potential	EA075	WATER	In house: Ion selective electrode
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Acidity as Calcium Carbonate	ED038	WATER	In house: Referenced to APHA 2310 B Acidity is determined by titration with a standardised alkali to an end-point pH of 8.3. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.



Analytical Methods	Method	Matrix	Method Descriptions
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with othophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)
Oxygen - Dissolved	EP025	WATER	In house: Referenced to APHA 4500-O G. Dissolved Oxygen Probe. This method is compliant with NEPM (2013) Schedule B(3)



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.



QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1806724	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MRIA - R8 Rehab	Date Samples Received	: 31-May-2018
Site	: ----	Issue Date	: 11-Jun-2018
Sampler	: ----	No. of samples received	: 5
Order number	: W81020-103	No. of samples analysed	: 5

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	14	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	07-Jun-2018	27-Nov-2018	✓
EG020T: Total Metals by ICP-MS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18, WQA03_31_05_18	31-May-2018	07-Jun-2018	27-Nov-2018	✓	07-Jun-2018	27-Nov-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	07-Jun-2018	27-Nov-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Unfiltered; Lab-acidified (EG093B-T) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18, WQA03_31_05_18	31-May-2018	07-Jun-2018	27-Nov-2018	✓	07-Jun-2018	27-Nov-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	31-May-2018	28-Jun-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	31-May-2018	02-Jun-2018	✓



Matrix: WATER

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	31-May-2018	28-Jun-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	07-Jun-2018	28-Jun-2018	✓	07-Jun-2018	28-Jun-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	07-Jun-2018	28-Jun-2018	✓	07-Jun-2018	28-Jun-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	31-May-2018	02-Jun-2018	✓
EP008: Chlorophyll a & Pheophytin a								
Glass Fibre Filter Paper (Chlorophyll) (EP008) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	----	----	----	07-Jun-2018	21-Jun-2018	✓
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP080) WQA03_31_05_18		31-May-2018	05-Jun-2018	07-Jun-2018	✓	05-Jun-2018	07-Jun-2018	✓
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_31_05_18, A2S_31_05_18, WQA03_31_05_18	A2_31_05_18, WQA02_31_05_18,	31-May-2018	06-Jun-2018	07-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	05-Jun-2018	14-Jun-2018	✓	05-Jun-2018	14-Jun-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP080) WQA03_31_05_18		31-May-2018	05-Jun-2018	07-Jun-2018	✓	05-Jun-2018	07-Jun-2018	✓
Amber Glass Bottle - Unpreserved (EP071) BLNS-B1_31_05_18, A2S_31_05_18, WQA03_31_05_18	A2_31_05_18, WQA02_31_05_18,	31-May-2018	06-Jun-2018	07-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_31_05_18, A2S_31_05_18,	A2_31_05_18, WQA02_31_05_18	31-May-2018	05-Jun-2018	14-Jun-2018	✓	05-Jun-2018	14-Jun-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber Glass Bottle - Unpreserved (EP080) WQA03_31_05_18	31-May-2018	05-Jun-2018	07-Jun-2018	✓	05-Jun-2018	07-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) BLNS-B1_31_05_18, A2_31_05_18, A2S_31_05_18, WQA02_31_05_18	31-May-2018	05-Jun-2018	14-Jun-2018	✓	05-Jun-2018	14-Jun-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	14	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1806777	Page	: 1 of 6
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Klinton Breese	Telephone	: 08 9406 1328
Project	: MDC	Date Samples Received	: 01-Jun-2018
Site	: ----	Issue Date	: 08-Jun-2018
Sampler	: LF	No. of samples received	: 1
Order number	: W81020-103	No. of samples analysed	: 1

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- **NO** Quality Control Sample Frequency Outliers exist.



Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method Container / Client Sample ID(s)	Extraction / Preparation			Analysis		
	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EA005P: pH by PC Titrator						
Clear Plastic Bottle - Natural PB-East	----	----	----	07-Jun-2018	01-Jun-2018	6

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EA005P: pH by PC Titrator							
Clear Plastic Bottle - Natural (EA005-P) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	01-Jun-2018	✖
EA010P: Conductivity by PC Titrator							
Clear Plastic Bottle - Natural (EA010-P) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	29-Jun-2018	✔
EA015: Total Dissolved Solids dried at 180 ± 5 °C							
Clear Plastic Bottle - Natural (EA015H) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	08-Jun-2018	✔
ED037P: Alkalinity by PC Titrator							
Clear Plastic Bottle - Natural (ED037-P) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	15-Jun-2018	✔
ED041G: Sulfate (Turbidimetric) as SO4 2- by DA							
Clear Plastic Bottle - Natural (ED041G) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	29-Jun-2018	✔
ED045G: Chloride by Discrete Analyser							
Clear Plastic Bottle - Natural (ED045G) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	29-Jun-2018	✔
ED093F: Dissolved Major Cations							
Clear Plastic Bottle - Natural (ED093F) PB-East	01-Jun-2018	----	----	----	06-Jun-2018	08-Jun-2018	✔

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 Work Order : EP1806777
 Client : MRIA
 Project : MDC



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG020A-F) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	28-Nov-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear HDPE (U-T ORC) - Filtered; Lab-acidified (EG093B-F) PB-East	01-Jun-2018	----	----	----	07-Jun-2018	28-Nov-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	2	6	33.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Alkalinity by PC Titrator	ED037-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
pH by PC Titrator	EA005-P	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	2	11	18.18	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Alkalinity by PC Titrator	ED037-P	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Conductivity by PC Titrator	EA010-P	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Major Cations - Dissolved	ED093F	1	6	16.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Dissolved Solids (High Level)	EA015H	1	11	9.09	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Chloride by Discrete Analyser	ED045G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
pH by PC Titrator	EA005-P	WATER	In house: Referenced to APHA 4500 H+ B. This procedure determines pH of water samples by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Conductivity by PC Titrator	EA010-P	WATER	In house: Referenced to APHA 2510 B. This procedure determines conductivity by automated ISE. This method is compliant with NEPM (2013) Schedule B(3)
Total Dissolved Solids (High Level)	EA015H	WATER	In house: Referenced to APHA 2540C. A gravimetric procedure that determines the amount of 'filterable' residue in an aqueous sample. A well-mixed sample is filtered through a glass fibre filter (1.2um). The filtrate is evaporated to dryness and dried to constant weight at 180+/-5C. This method is compliant with NEPM (2013) Schedule B(3)
Alkalinity by PC Titrator	ED037-P	WATER	In house: Referenced to APHA 2320 B This procedure determines alkalinity by automated measurement (e.g. PC Titrate) using pH 4.5 for indicating the total alkalinity end-point. This method is compliant with NEPM (2013) Schedule B(3)
Sulfate (Turbidimetric) as SO4 2- by Discrete Analyser	ED041G	WATER	In house: Referenced to APHA 4500-SO4. Dissolved sulfate is determined in a 0.45um filtered sample. Sulfate ions are converted to a barium sulfate suspension in an acetic acid medium with barium chloride. Light absorbance of the BaSO4 suspension is measured by a photometer and the SO4-2 concentration is determined by comparison of the reading with a standard curve. This method is compliant with NEPM (2013) Schedule B(3)
Chloride by Discrete Analyser	ED045G	WATER	In house: Referenced to APHA 4500 Cl - G. The thiocyanate ion is liberated from mercuric thiocyanate through sequestration of mercury by the chloride ion to form non-ionised mercuric chloride. In the presence of ferric ions the liberated thiocyanate forms highly-coloured ferric thiocyanate which is measured at 480 nm APHA 21st edition seal method 2 017-1-L april 2003
Major Cations - Dissolved	ED093F	WATER	In house: Referenced to APHA 3120 and 3125; USEPA SW 846 - 6010 and 6020; Cations are determined by either ICP-AES or ICP-MS techniques. This method is compliant with NEPM (2013) Schedule B(3) Sodium Adsorption Ratio is calculated from Ca, Mg and Na which determined by ALS in house method QWI-EN/ED093F. This method is compliant with NEPM (2013) Schedule B(3) Hardness parameters are calculated based on APHA 2340 B. This method is compliant with NEPM (2013) Schedule B(3)
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)

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Work Order : EP1806777
Client : MRIA
Project : MDC



<i>Analytical Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
Ionic Balance by PCT DA and Turbi SO4 DA	EN055 - PG	WATER	In house: Referenced to APHA 1030F. This method is compliant with NEPM (2013) Schedule B(3)

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1806776	Page	: 1 of 9
Amendment	: 1		
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Telephone	: 08 9406 1328
Project	: 60478410	Date Samples Received	: 01-Jun-2018
Site	: ----	Issue Date	: 12-Jun-2018
Sampler	: Tim Williamson	No. of samples received	: 13
Order number	: W81020-103	No. of samples analysed	: 13

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatle Fraction	0	20	0.00	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	----	----	----	07-Jun-2018	28-Nov-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_01_06_18	01-Jun-2018	08-Jun-2018	28-Nov-2018	✓	08-Jun-2018	28-Nov-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	----	----	----	01-Jun-2018	29-Jun-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	----	----	----	01-Jun-2018	03-Jun-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	----	----	----	01-Jun-2018	29-Jun-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	08-Jun-2018	29-Jun-2018	✓	08-Jun-2018	29-Jun-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	08-Jun-2018	29-Jun-2018	✓	08-Jun-2018	29-Jun-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18, GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	----	----	----	01-Jun-2018	03-Jun-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, WQA03_01_06_18, D2_01_06_18	GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D1_01_06_18,	01-Jun-2018	06-Jun-2018	08-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber Glass Bottle - Unpreserved (EP080) WQA03_01_06_18		01-Jun-2018	08-Jun-2018	08-Jun-2018	✓	08-Jun-2018	08-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18,	GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	08-Jun-2018	15-Jun-2018	✓	08-Jun-2018	15-Jun-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, WQA03_01_06_18, D2_01_06_18	GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D1_01_06_18,	01-Jun-2018	06-Jun-2018	08-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber Glass Bottle - Unpreserved (EP080) WQA03_01_06_18		01-Jun-2018	08-Jun-2018	08-Jun-2018	✓	08-Jun-2018	08-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_01_06_18, GW-D5_01_06_18, T3B_01_06_18, BH10_01_06_18, GW-T3E-A_01_06_18, D1_01_06_18,	GW-D4_01_06_18, GW-D8_01_06_18, T3C_01_06_18, BH12_01_06_18, WQA01_01_06_18, D2_01_06_18	01-Jun-2018	08-Jun-2018	15-Jun-2018	✓	08-Jun-2018	15-Jun-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EP080: BTEXN							
Amber Glass Bottle - Unpreserved (EP080) WQA03_01_06_18	01-Jun-2018	08-Jun-2018	08-Jun-2018	✓	08-Jun-2018	08-Jun-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_01_06_18, GW-D4_01_06_18, GW-D5_01_06_18, GW-D8_01_06_18, T3B_01_06_18, T3C_01_06_18, BH10_01_06_18, BH12_01_06_18, GW-T3E-A_01_06_18, WQA01_01_06_18, D1_01_06_18, D2_01_06_18	01-Jun-2018	08-Jun-2018	15-Jun-2018	✓	08-Jun-2018	15-Jun-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✘ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	15	13.33	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	35	11.43	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	12	16.67	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	34	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	20	0.00	10.00	✘	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Matrix Spikes (MS) - Continued							
Nitrite as N by Discrete Analyser	EK057G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	35	5.71	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	12	8.33	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	34	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1807736	Page	: 1 of 8
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 27-Jun-2018
Site	: ----	Issue Date	: 04-Jul-2018
Sampler	: D. Sullivan	No. of samples received	: 12
Order number	: W81020-103	No. of samples analysed	: 9

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Ar	EP1807691--001	Anonymous	Nitrite + Nitrate as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatile Fraction	0	15	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatile Fraction	0	15	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	04-Jul-2018	24-Dec-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_27_06_18	27-Jun-2018	04-Jul-2018	24-Dec-2018	✓	04-Jul-2018	24-Dec-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG093B-F) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	04-Jul-2018	24-Dec-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-T) WQA03_27_06_18	27-Jun-2018	04-Jul-2018	24-Dec-2018	✓	04-Jul-2018	24-Dec-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	27-Jun-2018	25-Jul-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	27-Jun-2018	29-Jun-2018	✓
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	27-Jun-2018	25-Jul-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	04-Jul-2018	25-Jul-2018	✓	04-Jul-2018	25-Jul-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	04-Jul-2018	25-Jul-2018	✓	04-Jul-2018	25-Jul-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) GW-D5_27_06_18, T3B_27_06_18, T4B_27_06_18, T4C_27_06_18, D2_27_06_18, D1_27_06_18, GW-T3E-A_27_06_18, WQA01_27_06_18	27-Jun-2018	----	----	----	27-Jun-2018	29-Jun-2018	✓



Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D5_27_06_18, T4B_27_06_18, D2_27_06_18, GW-T3E-A_27_06_18, WQA03_27_06_18	T3B_27_06_18, T4C_27_06_18, D1_27_06_18, WQA01_27_06_18,	27-Jun-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D5_27_06_18, T4B_27_06_18, D2_27_06_18, GW-T3E-A_27_06_18, WQA03_27_06_18	T3B_27_06_18, T4C_27_06_18, D1_27_06_18, WQA01_27_06_18,	27-Jun-2018	29-Jun-2018	11-Jul-2018	✓	29-Jun-2018	11-Jul-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071)								
GW-D5_27_06_18, T4B_27_06_18, D2_27_06_18, GW-T3E-A_27_06_18, WQA03_27_06_18	T3B_27_06_18, T4C_27_06_18, D1_27_06_18, WQA01_27_06_18,	27-Jun-2018	29-Jun-2018	04-Jul-2018	✓	02-Jul-2018	08-Aug-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D5_27_06_18, T4B_27_06_18, D2_27_06_18, GW-T3E-A_27_06_18, WQA03_27_06_18	T3B_27_06_18, T4C_27_06_18, D1_27_06_18, WQA01_27_06_18,	27-Jun-2018	29-Jun-2018	11-Jul-2018	✓	29-Jun-2018	11-Jul-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080)								
GW-D5_27_06_18, T4B_27_06_18, D2_27_06_18, GW-T3E-A_27_06_18, WQA03_27_06_18	T3B_27_06_18, T4C_27_06_18, D1_27_06_18, WQA01_27_06_18,	27-Jun-2018	29-Jun-2018	11-Jul-2018	✓	29-Jun-2018	11-Jul-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	15	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	9	11.11	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined seperately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1807774	Page	: 1 of 9
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Telephone	: 08 9406 1328
Project	: MRIA (Roe 8 Rehab)	Date Samples Received	: 28-Jun-2018
Site	: ----	Issue Date	: 05-Jul-2018
Sampler	: D Sullivan	No. of samples received	: 10
Order number	: W81020-103	No. of samples analysed	: 10

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- Matrix Spike outliers exist - please see following pages for full details.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **WATER**

Compound Group Name	Laboratory Sample ID	Client Sample ID	Analyte	CAS Number	Data	Limits	Comment
Matrix Spike (MS) Recoveries							
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser	EP1807761--002	Anonymous	Total Kjeldahl Nitrogen as N	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.
EK067G: Total Phosphorus as P by Discrete Analyser	EP1807761--002	Anonymous	Total Phosphorus as P	----	Not Determined	----	MS recovery not determined, background level greater than or equal to 4x spike level.

Outliers : Analysis Holding Time Compliance

Matrix: **WATER**

Method	Extraction / Preparation			Analysis			
	Container / Client Sample ID(s)	Date extracted	Due for extraction	Days overdue	Date analysed	Due for analysis	Days overdue
EP008: Chlorophyll a & Pheophytin a							
White Plastic Bottle - Unpreserved							
BLNS-B1_28_06_18,	A2_28_06_18,	----	----	----	02-Jul-2018	30-Jun-2018	2
A2S_28_06_18,	WQA02_28_06_18						

Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
Chlorophyll a and Pheophytin a	0	4	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	1	15	6.67	10.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method	Sample Date	Extraction / Preparation			Analysis		
		Container / Client Sample ID(s)	Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18 GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18	28-Jun-2018	----	----	----	04-Jul-2018	25-Dec-2018	✓
EG020T: Total Metals by ICP-MS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) WQA03_28_06_18	28-Jun-2018	03-Jul-2018	25-Dec-2018	✓	03-Jul-2018	25-Dec-2018	✓
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG020A-T) BLNS-B1_28_06_18, A2S_28_06_18, WQA02_28_06_18 A2_28_06_18	28-Jun-2018	04-Jul-2018	25-Dec-2018	✓	04-Jul-2018	25-Dec-2018	✓
EG093F: Dissolved Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG093B-F) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18 GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18	28-Jun-2018	----	----	----	04-Jul-2018	25-Dec-2018	✓
EG093T: Total Metals in Saline Water by ORC-ICPMS							
Clear Plastic Bottle - Unfiltered; Lab-acidified (EG093B-T) BLNS-B1_28_06_18, A2S_28_06_18, WQA02_28_06_18 A2_28_06_18	28-Jun-2018	04-Jul-2018	25-Dec-2018	✓	04-Jul-2018	25-Dec-2018	✓
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18 GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18	28-Jun-2018	----	----	----	28-Jun-2018	26-Jul-2018	✓
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18 GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18	28-Jun-2018	----	----	----	28-Jun-2018	30-Jun-2018	✓



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK059G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18,	28-Jun-2018	----	----	----	28-Jun-2018	26-Jul-2018	✓
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK061G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18,	28-Jun-2018	04-Jul-2018	26-Jul-2018	✓	04-Jul-2018	26-Jul-2018	✓
EK067G: Total Phosphorus as P by Discrete Analyser								
Clear Plastic Bottle - Sulfuric Acid (EK067G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18,	28-Jun-2018	04-Jul-2018	26-Jul-2018	✓	04-Jul-2018	26-Jul-2018	✓
EK071G: Reactive Phosphorus as P by discrete analyser								
Clear Plastic Bottle - Natural (EK071G) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18,	28-Jun-2018	----	----	----	28-Jun-2018	30-Jun-2018	✓
EP008: Chlorophyll a & Pheophytin a								
White Plastic Bottle - Unpreserved (EP008) BLNS-B1_28_06_18, A2S_28_06_18,	A2_28_06_18, WQA02_28_06_18	28-Jun-2018	----	----	----	02-Jul-2018	30-Jun-2018	*



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18,	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18, WQA03_28_06_18	28-Jun-2018	02-Jul-2018	05-Jul-2018	✓	02-Jul-2018	11-Aug-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18,	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18, WQA03_28_06_18	28-Jun-2018	03-Jul-2018	12-Jul-2018	✓	03-Jul-2018	12-Jul-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18,	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18, WQA03_28_06_18	28-Jun-2018	02-Jul-2018	05-Jul-2018	✓	02-Jul-2018	11-Aug-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18,	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18, WQA03_28_06_18	28-Jun-2018	03-Jul-2018	12-Jul-2018	✓	03-Jul-2018	12-Jul-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) GW-D3_28_06_18, GW-D8_28_06_18, BH12_28_06_18, A2_28_06_18, WQA02_28_06_18,	GW-D4_28_06_18, BH10_28_06_18, BLNS-B1_28_06_18, A2S_28_06_18, WQA03_28_06_18	28-Jun-2018	03-Jul-2018	12-Jul-2018	✓	03-Jul-2018	12-Jul-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	0	4	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	2	17	11.76	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	2	14	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	4	38	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	4	38	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	15	6.67	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	16	12.50	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatle Fraction	EP071	1	15	6.67	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Chlorophyll a and Pheophytin a	EP008	1	4	25.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	1	17	5.88	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	38	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER** Evaluation: * = Quality Control frequency not within specification ; ✓ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Method Blanks (MB) - Continued							
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	1	5	20.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	20	5.00	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	14	7.14	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Metals by ICP-MS - Suite A	EG020A-T	1	8	12.50	5.00	✓	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	38	5.26	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	15	6.67	5.00	✓	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	16	6.25	5.00	✓	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Total Metals by ICP-MS - Suite A	EG020A-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Dissolved Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020 Samples are 0.45µm filtered prior to analysis. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Total Metals in Saline Water -Suite B by ORC-ICPMS	EG093B-T	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020. The ORC-ICPMS technique removes interfering species through a series of chemical reactions prior to ion detection. Ions are passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to measurement by a discrete dynode ion detector. This method is compliant with NEPM (2013) Schedule B(3)
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)



Analytical Methods	Method	Matrix	Method Descriptions
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Chlorophyll a and Pheophytin a	EP008	WATER	In house: Referenced to APHA 10200 H. The pigments are extracted into aqueous acetone. The optical density of the extract before and after acidification at both 664 nm and 665 nm is determined spectrometrically.
TRH - Semivolatile Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)

Preparation Methods	Method	Matrix	Method Descriptions
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals	EN25	WATER	In house: Referenced to USEPA SW846-3005. Method 3005 is a Nitric/Hydrochloric acid digestion procedure used to prepare surface and ground water samples for analysis by ICPAES or ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Digestion for Total Recoverable Metals - ORC	EN25-ORC	WATER	In house: Referenced to USEPA SW846-3005. This is an Ultrapure Nitric acid digestion procedure used to prepare surface and ground water samples for analysis by ORC- ICPMS. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

QA/QC Compliance Assessment to assist with Quality Review

Work Order	: EP1806725	Page	: 1 of 7
Amendment	: 1		
Client	: MRIA	Laboratory	: Environmental Division Perth
Contact	: Chris McGraghan	Telephone	: 08 9406 1328
Project	: 60478410	Date Samples Received	: 31-May-2018
Site	: ----	Issue Date	: 13-Jun-2018
Sampler	: Tim Williamson	No. of samples received	: 2
Order number	: W81020-103	No. of samples analysed	: 2

This report is automatically generated by the ALS LIMS through interpretation of the ALS Quality Control Report and several Quality Assurance parameters measured by ALS. This automated reporting highlights any non-conformances, facilitates faster and more accurate data validation and is designed to assist internal expert and external Auditor review. Many components of this report contribute to the overall DQO assessment and reporting for guideline compliance.

Brief method summaries and references are also provided to assist in traceability.

Summary of Outliers

Outliers : Quality Control Samples

This report highlights outliers flagged in the Quality Control (QC) Report.

- **NO** Method Blank value outliers occur.
- **NO** Duplicate outliers occur.
- **NO** Laboratory Control outliers occur.
- **NO** Matrix Spike outliers occur.
- For all regular sample matrices, **NO** surrogate recovery outliers occur.

Outliers : Analysis Holding Time Compliance

- **NO** Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers exist - please see following pages for full details.



Outliers : Frequency of Quality Control Samples

Matrix: **WATER**

Quality Control Sample Type Method	Count		Rate (%)		Quality Control Specification
	QC	Regular	Actual	Expected	
Laboratory Duplicates (DUP)					
TRH - Semivolatle Fraction	0	2	0.00	10.00	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)					
TRH - Semivolatle Fraction	0	2	0.00	5.00	NEPM 2013 B3 & ALS QC Standard

Analysis Holding Time Compliance

If samples are identified below as having been analysed or extracted outside of recommended holding times, this should be taken into consideration when interpreting results.

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times (referencing USEPA SW 846, APHA, AS and NEPM) based on the sample container provided. Dates reported represent first date of extraction or analysis and preclude subsequent dilutions and reruns. A listing of breaches (if any) is provided herein.

Holding time for leachate methods (e.g. TCLP) vary according to the analytes reported. Assessment compares the leach date with the shortest analyte holding time for the equivalent soil method. These are: organics 14 days, mercury 28 days & other metals 180 days. A recorded breach does not guarantee a breach for all non-volatile parameters.

Holding times for VOC in soils vary according to analytes of interest. Vinyl Chloride and Styrene holding time is 7 days; others 14 days. A recorded breach does not guarantee a breach for all VOC analytes and should be verified in case the reported breach is a false positive or Vinyl Chloride and Styrene are not key analytes of interest/concern.

Matrix: **WATER**

Evaluation: ✖ = Holding time breach ; ✔ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis		
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation
EG020F: Dissolved Metals by ICP-MS							
Clear Plastic Bottle - Filtered; Lab-acidified (EG020A-F) T4B_31_05_18, T4C_31_05_18	31-May-2018	----	----	----	07-Jun-2018	27-Nov-2018	✔
EK055G: Ammonia as N by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK055G) T4B_31_05_18, T4C_31_05_18	31-May-2018	----	----	----	31-May-2018	28-Jun-2018	✔
EK057G: Nitrite as N by Discrete Analyser							
Clear Plastic Bottle - Natural (EK057G) T4B_31_05_18, T4C_31_05_18	31-May-2018	----	----	----	31-May-2018	02-Jun-2018	✔
EK059G: Nitrite plus Nitrate as N (NOx) by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK059G) T4B_31_05_18, T4C_31_05_18	31-May-2018	----	----	----	31-May-2018	28-Jun-2018	✔
EK061G: Total Kjeldahl Nitrogen By Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK061G) T4B_31_05_18, T4C_31_05_18	31-May-2018	07-Jun-2018	28-Jun-2018	✔	07-Jun-2018	28-Jun-2018	✔
EK067G: Total Phosphorus as P by Discrete Analyser							
Clear Plastic Bottle - Sulfuric Acid (EK067G) T4B_31_05_18, T4C_31_05_18	31-May-2018	07-Jun-2018	28-Jun-2018	✔	07-Jun-2018	28-Jun-2018	✔
EK071G: Reactive Phosphorus as P by discrete analyser							
Clear Plastic Bottle - Natural (EK071G) T4B_31_05_18, T4C_31_05_18	31-May-2018	----	----	----	31-May-2018	02-Jun-2018	✔



Matrix: **WATER** Evaluation: * = Holding time breach ; ✓ = Within holding time.

Method Container / Client Sample ID(s)	Sample Date	Extraction / Preparation			Analysis			
		Date extracted	Due for extraction	Evaluation	Date analysed	Due for analysis	Evaluation	
EP080/071: Total Petroleum Hydrocarbons								
Amber Glass Bottle - Unpreserved (EP071) T4B_31_05_18,	T4C_31_05_18	31-May-2018	06-Jun-2018	07-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4B_31_05_18,	T4C_31_05_18	31-May-2018	06-Jun-2018	14-Jun-2018	✓	06-Jun-2018	14-Jun-2018	✓
EP080/071: Total Recoverable Hydrocarbons - NEPM 2013 Fractions								
Amber Glass Bottle - Unpreserved (EP071) T4B_31_05_18,	T4C_31_05_18	31-May-2018	06-Jun-2018	07-Jun-2018	✓	07-Jun-2018	16-Jul-2018	✓
Amber VOC Vial - Sulfuric Acid (EP080) T4B_31_05_18,	T4C_31_05_18	31-May-2018	06-Jun-2018	14-Jun-2018	✓	06-Jun-2018	14-Jun-2018	✓
EP080: BTEXN								
Amber VOC Vial - Sulfuric Acid (EP080) T4B_31_05_18,	T4C_31_05_18	31-May-2018	06-Jun-2018	14-Jun-2018	✓	06-Jun-2018	14-Jun-2018	✓



Quality Control Parameter Frequency Compliance

The following report summarises the frequency of laboratory QC samples analysed within the analytical lot(s) in which the submitted sample(s) was(were) processed. Actual rate should be greater than or equal to the expected rate. A listing of breaches is provided in the Summary of Outliers.

Matrix: **WATER** Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Reaular	Actual	Expected	Evaluation	
Analytical Methods							
Laboratory Duplicates (DUP)							
Ammonia as N by Discrete analyser	EK055G	2	20	10.00	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	2	19	10.53	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	2	18	11.11	10.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	2	0.00	10.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	2	13	15.38	10.00	✔	NEPM 2013 B3 & ALS QC Standard
Laboratory Control Samples (LCS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Method Blanks (MB)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	1	2	50.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Matrix Spikes (MS)							
Ammonia as N by Discrete analyser	EK055G	1	20	5.00	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Dissolved Metals by ICP-MS - Suite A	EG020A-F	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	1	19	5.26	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Nitrite as N by Discrete Analyser	EK057G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Reactive Phosphorus as P-By Discrete Analyser	EK071G	1	7	14.29	5.00	✔	NEPM 2013 B3 & ALS QC Standard
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Matrix: **WATER**

Evaluation: ✖ = Quality Control frequency not within specification ; ✔ = Quality Control frequency within specification.

Quality Control Sample Type	Method	Count		Rate (%)			Quality Control Specification
		QC	Regular	Actual	Expected	Evaluation	
Analytical Methods							
Matrix Spikes (MS) - Continued							
Total Phosphorus as P By Discrete Analyser	EK067G	1	18	5.56	5.00	✔	NEPM 2013 B3 & ALS QC Standard
TRH - Semivolatile Fraction	EP071	0	2	0.00	5.00	✖	NEPM 2013 B3 & ALS QC Standard
TRH Volatiles/BTEX	EP080	1	13	7.69	5.00	✔	NEPM 2013 B3 & ALS QC Standard



Brief Method Summaries

The analytical procedures used by the Environmental Division have been developed from established internationally recognized procedures such as those published by the US EPA, APHA, AS and NEPM. In house developed procedures are employed in the absence of documented standards or by client request. The following report provides brief descriptions of the analytical procedures employed for results reported in the Certificate of Analysis. Sources from which ALS methods have been developed are provided within the Method Descriptions.

Analytical Methods	Method	Matrix	Method Descriptions
Dissolved Metals by ICP-MS - Suite A	EG020A-F	WATER	In house: Referenced to APHA 3125; USEPA SW846 - 6020, ALS QWI-EN/EG020. Samples are 0.45µm filtered prior to analysis. The ICPMS technique utilizes a highly efficient argon plasma to ionize selected elements. Ions are then passed into a high vacuum mass spectrometer, which separates the analytes based on their distinct mass to charge ratios prior to their measurement by a discrete dynode ion detector.
Ammonia as N by Discrete analyser	EK055G	WATER	In house: Referenced to APHA 4500-NH3 G Ammonia is determined by direct colorimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite as N by Discrete Analyser	EK057G	WATER	In house: Referenced to APHA 4500-NO2- B. Nitrite is determined by direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Nitrate as N by Discrete Analyser	EK058G	WATER	In house: Referenced to APHA 4500-NO3- F. Nitrate is reduced to nitrite by way of a chemical reduction followed by quantification by Discrete Analyser. Nitrite is determined separately by direct colourimetry and result for Nitrate calculated as the difference between the two results. This method is compliant with NEPM (2013) Schedule B(3)
Nitrite and Nitrate as N (NOx) by Discrete Analyser	EK059G	WATER	In house: Referenced to APHA 4500-NO3- F. Combined oxidised Nitrogen (NO2+NO3) is determined by Chemical Reduction and direct colourimetry by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Kjeldahl Nitrogen as N By Discrete Analyser	EK061G	WATER	In house: Referenced to APHA 4500-Norg D (In house). An aliquot of sample is digested using a high temperature Kjeldahl digestion to convert nitrogenous compounds to ammonia. Ammonia is determined colorimetrically by discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Total Nitrogen as N (TKN + Nox) By Discrete Analyser	EK062G	WATER	In house: Referenced to APHA 4500-Norg / 4500-NO3-. This method is compliant with NEPM (2013) Schedule B(3)
Total Phosphorus as P By Discrete Analyser	EK067G	WATER	In house: Referenced to APHA 4500-P H, Jirka et al (1976), Zhang et al (2006). This procedure involves sulphuric acid digestion of a sample aliquot to break phosphorus down to orthophosphate. The orthophosphate reacts with ammonium molybdate and antimony potassium tartrate to form a complex which is then reduced and its concentration measured at 880nm using discrete analyser. This method is compliant with NEPM (2013) Schedule B(3)
Reactive Phosphorus as P-By Discrete Analyser	EK071G	WATER	In house: Referenced to APHA 4500-P F Ammonium molybdate and potassium antimonyl tartrate reacts in acid medium with orthophosphate to form a heteropoly acid -phosphomolybdic acid - which is reduced to intensely coloured molybdenum blue by ascorbic acid. Quantification is by Discrete Analyser. This method is compliant with NEPM (2013) Schedule B(3)
TRH - Semivolatle Fraction	EP071	WATER	In house: Referenced to USEPA SW 846 - 8015A The sample extract is analysed by Capillary GC/FID and quantification is by comparison against an established 5 point calibration curve of n-Alkane standards. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
TRH Volatiles/BTEX	EP080	WATER	In house: Referenced to USEPA SW 846 - 8260B Water samples are directly purged prior to analysis by Capillary GC/MS and quantification is by comparison against an established 5 point calibration curve. Alternatively, a sample is equilibrated in a headspace vial and a portion of the headspace determined by GCMS analysis. This method is compliant with the QC requirements of NEPM (2013) Schedule B(3)
Preparation Methods	Method	Matrix	Method Descriptions



<i>Preparation Methods</i>	<i>Method</i>	<i>Matrix</i>	<i>Method Descriptions</i>
TKN/TP Digestion	EK061/EK067	WATER	In house: Referenced to APHA 4500 Norg - D; APHA 4500 P - H. This method is compliant with NEPM (2013) Schedule B(3)
Separatory Funnel Extraction of Liquids	ORG14	WATER	In house: Referenced to USEPA SW 846 - 3510B 100 mL to 1L of sample is transferred to a separatory funnel and serially extracted three times using 60mL DCM for each extract. The resultant extracts are combined, dehydrated and concentrated for analysis. This method is compliant with NEPM (2013) Schedule B(3) . ALS default excludes sediment which may be resident in the container.
Volatiles Water Preparation	ORG16-W	WATER	A 5 mL aliquot or 5 mL of a diluted sample is added to a 40 mL VOC vial for sparging.

Appendix D: Calibration Records

EQUIPMENT INFORMATION

 Instrument: YSIProDSS-1P
 Serial Number: 15G100712 (Display)

EQUIPMENT CHECK

EQUIPMENT CHECK	Enclosed	Comment
YSI Pro DSS Display	<input checked="" type="checkbox"/>	
YSI 4 port Sonde	<input checked="" type="checkbox"/>	
- YSI pH / ORP probe	<input checked="" type="checkbox"/>	
- YSI-Turbidity Probe	<input checked="" type="checkbox"/>	
- YSI Cond/Temp Probe	<input checked="" type="checkbox"/>	
- YSI ODO Sensor	<input checked="" type="checkbox"/>	
Flow Cell	<input checked="" type="checkbox"/>	
Probe Guard & weight	<input checked="" type="checkbox"/>	
Storage/Calibration Sleeve (with Gasket)	<input checked="" type="checkbox"/>	
Charger & PC Cable	<input checked="" type="checkbox"/>	
Instruction Manual & Field Sheets	<input checked="" type="checkbox"/>	
Battery Charged 100%	<input checked="" type="checkbox"/>	

SENSOR CALIBRATION DETAILS

	Calibration Undertaken	Accuracy	Pass	Fail
Temperature	Factory Calibrated	$\pm 0.2^{\circ}\text{C}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dissolved Oxygen	<input checked="" type="checkbox"/> 100% Saturation	$\pm 2\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Pressure Compensation	1008.9 hPa	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conductivity	<input checked="" type="checkbox"/> 1288mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Check linearity at 1.4mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Salinity	Auto Calibrated	$\pm 1\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
pH	<input checked="" type="checkbox"/> pH 7.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> pH 4.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ORP	<input checked="" type="checkbox"/> 244 mV at 18 °C	$\pm 20\text{mV}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Turbidity	0, 124 NTU / FNU Sonde – 15H101896			

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure as recommended in the instrument service manual.

ECO Standard Rental Terms & Conditions apply to all equipment calibrations.

Regards,

Paul Goodgame

ECO Environmental Equipment Specialist

Date: 22.06.2017

EQUIPMENT INFORMATION

 Instrument: YSIProDSS-1P
 Serial Number: 15G100712 (Display)

EQUIPMENT CHECK	Enclosed	Comment
YSI Pro DSS Display	<input checked="" type="checkbox"/>	
YSI 4 port Sonde	<input checked="" type="checkbox"/>	
- YSI pH / ORP probe	<input checked="" type="checkbox"/>	
- YSI-Turbidity Probe	<input checked="" type="checkbox"/>	
- YSI Cond/Temp Probe	<input checked="" type="checkbox"/>	
- YSI ODO Sensor	<input checked="" type="checkbox"/>	
Flow Cell	<input checked="" type="checkbox"/>	
Probe Guard & weight	<input checked="" type="checkbox"/>	
Storage/Calibration Sleeve (with Gasket)	<input checked="" type="checkbox"/>	
Charger & PC Cable	<input checked="" type="checkbox"/>	
Instruction Manual & Field Sheets	<input checked="" type="checkbox"/>	
Battery Charged 100%	<input checked="" type="checkbox"/>	

SENSOR CALIBRATION DETAILS

	Calibration Undertaken	Accuracy	Pass	Fail
Temperature	Factory Calibrated	$\pm 0.2^{\circ}\text{C}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dissolved Oxygen	<input checked="" type="checkbox"/> 100% Saturation	$\pm 2\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Pressure Compensation	1020 hPa	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conductivity	<input checked="" type="checkbox"/> 1288mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Check linearity at 1.4mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Salinity	Auto Calibrated	$\pm 1\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
pH	<input checked="" type="checkbox"/> pH 7.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> pH 4.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ORP	<input checked="" type="checkbox"/> 244 mV at 18 $^{\circ}\text{C}$	$\pm 20\text{mV}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Turbidity	0, 124 NTU / FNU Sonde - 15H101896			<input type="checkbox"/>

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure as recommended in the instrument service manual.

ECO Standard Rental Terms & Conditions apply to all equipment calibrations.

Regards,

Mitch Lawson

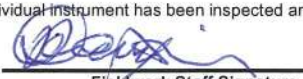
ECO Environmental Equipment Specialist

Date: 17.07.2017

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Buidling Roe 8	Project Number:	60478410		
Project Location:	Beelilar Wetlands	Client:	Main Roads		
PM Name:	M. O'Rourke	Fieldwork Staff Name:	TW, LF		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:	ECO Environmental				
Make and Model:	YSI Pro DSS				
Serial Number:	15G103303				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen <i>ORP</i>	
Units	pH	pH	µS/cm	ppm mV	ppm
Calibration Standard Concentration:	7.04 @ 15°C	4.0 @ 15°C	1147 @ 15°C	251 @ 15°C	
Bump Test Reading:	7.11	4.10	1142	246.7	
Bump Test Temperature:	15.9	15.6	15.6	15.4	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
 Fieldwork Staff Signature			26/7/17 Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Buidling Roe 8	Project Number:	60478410		
Project Location:	Beeliar Wetlands	Client:	Main Roads		
PM Name:	M. O'Rourke	Fieldwork Staff Name:	TW, LF		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:	ECO				
Make and Model:	YSI Pro DSS				
Serial Number:	15G103303				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:	12/7/17. @ 7:00AM.				
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH 4	pH 7	µS/cm	mV ppm	ppm
Calibration Standard Concentration:	4.	7	1413	251 mV	
Calibration Reading:	4.08	7.03	1407	253 mV	
Calibration Temperature:	15.7	15.7	15.7	15.7	
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____ Fieldwork Staff Signature			_____ Date		
Distribution: Project Central File					

EQUIPMENT INFORMATION

Instrument: YSIProDSS-1P
 Serial Number: 15G100712 (Display)

EQUIPMENT CHECK

	Enclosed	Comment
YSI Pro DSS Display	<input checked="" type="checkbox"/>	
YSI 4 port Sonde	<input checked="" type="checkbox"/>	
- YSI pH / ORP probe	<input checked="" type="checkbox"/>	
- YSI-Turbidity Probe	<input checked="" type="checkbox"/>	
- YSI Cond/Temp Probe	<input checked="" type="checkbox"/>	
- YSI ODO Sensor	<input checked="" type="checkbox"/>	
Flow Cell	<input checked="" type="checkbox"/>	
Probe Guard & weight	<input checked="" type="checkbox"/>	
Storage/Calibration Sleeve (with Gasket)	<input checked="" type="checkbox"/>	
Charger & PC Cable	<input checked="" type="checkbox"/>	
Instruction Manual & Field Sheets	<input checked="" type="checkbox"/>	
Battery Charged 100%	<input checked="" type="checkbox"/>	

SENSOR CALIBRATION DETAILS

	Calibration Undertaken	Accuracy	Pass	Fail
Temperature	Factory Calibrated	$\pm 0.2^{\circ}\text{C}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dissolved Oxygen	<input checked="" type="checkbox"/> 100% Saturation	$\pm 2\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Pressure Compensation	1031 hPa	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conductivity	<input checked="" type="checkbox"/> 1288mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Check linearity at 1.4mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Salinity	Auto Calibrated	$\pm 1\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
pH	<input checked="" type="checkbox"/> pH 7.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> pH 4.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ORP	<input checked="" type="checkbox"/> 251 mV at 15 $^{\circ}\text{C}$	$\pm 20\text{mV}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Turbidity	0, 124 NTU / FNU Sonde – 15H101896			<input type="checkbox"/>

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure as recommended in the instrument service manual.

ECO Standard Rental Terms & Conditions apply to all equipment calibrations.

Regards,

Mitch Lawson

ECO Environmental Equipment Specialist

Date: 29.06.2017

EQUIPMENT INFORMATION

Instrument: YSIProDSS-1P
Serial Number: 15G100712 (Display)

EQUIPMENT CHECK	Enclosed	Comment
YSI Pro DSS Display	<input checked="" type="checkbox"/>	
YSI 4 port Sonde	<input checked="" type="checkbox"/>	
- YSI pH / ORP probe	<input checked="" type="checkbox"/>	
- YSI-Turbidity Probe	<input checked="" type="checkbox"/>	
- YSI Cond/Temp Probe	<input checked="" type="checkbox"/>	
- YSI ODO Sensor	<input checked="" type="checkbox"/>	
Flow Cell	<input checked="" type="checkbox"/>	
Probe Guard & weight	<input checked="" type="checkbox"/>	
Storage/Calibration Sleeve (with Gasket)	<input checked="" type="checkbox"/>	
Charger & PC Cable	<input checked="" type="checkbox"/>	
Instruction Manual & Field Sheets	<input checked="" type="checkbox"/>	
Battery Charged 100%	<input checked="" type="checkbox"/>	

SENSOR CALIBRATION DETAILS

	Calibration Undertaken	Accuracy	Pass	Fail
Temperature	Factory Calibrated	$\pm 0.2^{\circ}\text{C}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Dissolved Oxygen	<input checked="" type="checkbox"/> 100% Saturation	$\pm 2\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	Pressure Compensation	1022.3 hPa	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Conductivity	<input checked="" type="checkbox"/> 1288mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> Check linearity at 1.4mS/cm	$\pm 0.5\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Salinity	Auto Calibrated	$\pm 1\%$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
pH	<input checked="" type="checkbox"/> pH 7.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input checked="" type="checkbox"/> pH 4.00	± 0.2	<input checked="" type="checkbox"/>	<input type="checkbox"/>
ORP	<input checked="" type="checkbox"/> 249 mV at 16 $^{\circ}\text{C}$	$\pm 20\text{mV}$	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Turbidity	0, 124 NTU / FNU Sonde – 15H101896			

This is to certify that where possible, this instrument has been calibrated in accordance with the manufacturer's calibration procedure as recommended in the instrument service manual.

ECO Standard Rental Terms & Conditions apply to all equipment calibrations.

Regards,

Kane Jackson

ECO Environmental Equipment Specialist

Date: 04.08.2017

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beelhar Wetlands	Client:	Main Roads		
PM Name:	M. O'Rourke	Fieldwork Staff Name:	TW, LF		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:	9/8/17 9:55am				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	ppm - mV	ppm
Calibration Standard Concentration:	4.0 @ 15°C	7.0 @ 15°C	1413 @ 25	262 @ 10°C	
Bump Test Reading:	4.07	7.07	1407	264.2	
Bump Test Temperature:	11.1°C	11°	11.1°C	11.1°C	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____			_____		
Fieldwork Staff Signature			Date		
Distribution: Project Central File					


FQM - Water Quality Meter Calibration Record

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beeliar Wetlands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:			
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____			_____		
Fieldwork Staff Signature			Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe B		Project Number:	60478410	
Project Location:	Beelir Wetlands		Client:	Main Roads	
PM Name:	Chris McGraghan		Fieldwork Staff Name:		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:	25/06/17				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.0 @ 15°C	7.04 @ 15°C	12880 @ 25°C	251 @ 15°C	
Bump Test Reading:	4.04	7.02	12805 (59°C)	247.9	
Bump Test Temperature:	17.6°C	17.6°C	17.7	17.6	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
 _____ Fieldwork Staff Signature			_____ 25/6/17 Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

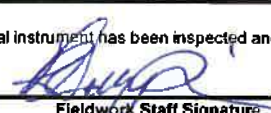
Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beeliar Wetlands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:			
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:	YSI Pro DSS				
Serial Number:	17H101156				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:	6 September 2017				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	ppm mV	ppm
Calibration Standard Concentration:	4.0 @ 15°C	7.04 @ 15°C	12990 @ 25°C	251 @ 15°C	262 @ 10°C
Bump Test Reading:	4.02	7.03	5PC 12930	261	
Bump Test Temperature:	11.7°C	11.8°C	12.2°C	11.6°C	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____			_____		
Fieldwork Staff Signature			Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

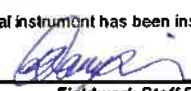
Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beeëlar Wetlands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:	RC		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:	YSI PRO DSS				
Serial Number:	17H101156				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV ppt	ppm
Calibration Standard Concentration:	4.0 @ 20°C	7.02 @ 20°C	12880 @ 25	240 @ 20°C	
Bump Test Reading:	4.01	7.03	12871 @ 18.4	238.5	
Bump Test Temperature:	19.3°C	18.2°C	18.4°C	18.7°C	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
 Fieldwork Staff Signature			26/9/17 Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beelar Wellands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:			
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.00 @ 20°C	7.02 @ 20°C	10882 @ 17°C	240 @ 20°C	
Calibration Reading:	4.00	7.02	10887	240.5	
Calibration Temperature:	17.8°C	17.9°C	17.7°C	17.8°C	
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:	2/11/17				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.00 @ 20°C	7.02 @ 20°C	10882 @ 17°C	240 @ 20°C	
Bump Test Reading:	4.00	7.02	10887	240.5	
Bump Test Temperature:	17.8°C	17.9°C	17.7°C	17.8°C	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
 _____ Fieldwork Staff Signature			_____ 2/11/2017 Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

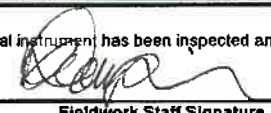
Q4AN(EV)-410-FM1

Project Name:	Building Roe 8		Project Number:	60478410	
Project Location:	Beeſar Wetlands		Client:	Main Roads	
PM Name:	Chris McGraghan		Fieldwork Staff Name:		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:	15/11/17 7:15am				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV ppm	ppm
Calibration Standard Concentration:	4.0@15°C	7.04@15°C	10480@15°C	251@15°C	
Bump Test Reading:	4.02	7.03	10697	246.4	
Bump Test Temperature:	16.6°C	16.3°C	16.3	16.2	
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____			_____		
Fieldwork Staff Signature			Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beelair Wetlands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:	RC		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:	YSI				
Make and Model:	YSI Pro DSS				
Serial Number:	17H101156				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:	21/12/2017				
Parameter	Acidity		Conductivity	ORP Dissolved Oxygen mV	
Units	pH	pH	µS/cm	ppm mV	ppm
Calibration Standard Concentration:	4.01@25°	7.00@25°C	12960	229@25°C	
Calibration Reading:	4.03	7.01	13181	228.8	
Calibration Temperature:	25.1°C	24.8°C	26.3°C	26.7°C	
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
 Fieldwork Staff Signature			21/12/2017 Date		
Distribution: Project Central File					

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beeliar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	VSI
Make and Model:	VSI Pro DSS
Serial Number:	17H101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	13/12/17				
Parameter	Acidity		Conductivity	pH ORP Dissolved Oxygen	
Units	pH	pH	µS/cm	mV ppm	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12880 @ 25°C	229 @ 25°C	
Calibration Reading:	4.02	7.01	13092	227.9	
Calibration Temperature:	24.9°C	24.8°C	25.4°C	25.6°C	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

13/01/17

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beeliar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	10/01/18				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV BPM	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	13880 @ 25°C	229 @ 25°C	
Bump Test Reading:	4.01	7.02	13157	228.9	
Bump Test Temperature:	24.6°C	25.1°C	25.6°C	24.9°C	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

10/01/2018

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beelihar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17A101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	1/12/2017				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12880	229 @ 25°C	
Bump Test Reading:	4.02	7.01	13014	228.6	
Bump Test Temperature:	24.8°C	24.7°C	24.8°C	25.1°C	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

1/12/17

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beellar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	4/10/2017				
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	4/10/2017				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm ppm
Calibration Standard Concentration:	4.0 @ 20°C	7.02 @ 20°C	11670 @ 20°C	240 @ 20°C	
Bump Test Reading:	3.99	7.01	11673	239.4	
Bump Test Temperature:	19.7°C	20.0°C	20.4°C	20.3°C	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

(Empty space for comments)

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

4/10/2017

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beeliar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	18/10/2017				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.0 @ 20°C	7.02 @ 20°C	11670 @ 20°C	240 @ 20°C	
Bump Test Reading:	3.98	7.03	11675.4	243	
Bump Test Temperature:	17.8°C	17.7°C	17.5°C	17.6°C	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

18/10/2017

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe B	Project Number:	60478410
Project Location:	Beeliar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	RC

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	24/01/2018				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12880 @ 25°C	229 @ 25°C	
Bump Test Reading:	4.01	7.02	12985	228.7	
Bump Test Temperature:	25.2	25.1	24.8	25.1	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

24/01/18

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beelihar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	174101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	22/2/18				
Parameter	Acidity		Conductivity	ORP Dissolved Oxygen	
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12300 @ 25°C	229 @ 25°C	
Calibration Reading:	4.01	7.00	12307	228.5	
Calibration Temperature:	24.9°C	25.1°C	24.8°C	24.7°C	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

22/2/18

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beeliar Wetlands	Client:	Main Roads
PM Name:	Chris McGrath	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	174101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	8/3/2018				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12880 @ 25°C	229 @ 25°C	
Calibration Reading:	4.00	7.01	12987	227.9	
Calibration Temperature:	24.9°C	25.1°C	24.8°C	24.3°C	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

8/3/2018

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beelihar Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H 101156

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Calibration Reading:					
Calibration Temperature:					

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:	22/3/2018				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.01 @ 25°C	7.00 @ 25°C	12830 @ 25°C	229 @ 25°C	
Bump Test Reading:	3.99	7.02	12631	231	
Bump Test Temperature:	23.1°C	23.1°C	22.8°C	23.2°C	

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.



 Fieldwork Staff Signature

22/3/18

 Date

Distribution: Project Central File

ANZ

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410
Project Location:	Beelair Wetlands	Client:	Main Roads
PM Name:	Chris McGraghan	Fieldwork Staff Name:	RC

This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.

INSTRUMENT DETAILS

Supplier:	YSI
Make and Model:	YSI Pro DSS
Serial Number:	17H10115B

CALIBRATION

CALIBRATE WITH CALIBRATION SOLUTIONS

Date and Time:	3 1 /4/13				
Parameter	Acidity		Conductivity	ORP	Dissolved Oxygen
Units	pH	pH	µS/cm	mV	ppm
Calibration Standard Concentration:	4.00@ 20°C	7.02@ 20°C	11670@ 20°C	240@ 20°C	
Calibration Reading:	4.00	7.02	11603	237.5	
Calibration Temperature:	19.7°C	19.9°C	20.3°C	19.8°C	

ONGOING CHECKS

BUMP TEST WITH CALIBRATION SOLUTION

Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					

COMMENTS

Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.

Approval and Distribution

Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.




 Fieldwork Staff Signature

3/4/13

 Date

Distribution: Project Central File

Water Quality Meter Calibration Record

Project Name:	Roe 8 Environmental Monitoring	Project:	MRIA DCT	
Project Location:	<i>Sibra Lake</i>	Client:	Main Roads	
PM Name:	Linda Kirchner	Fieldwork Staff Name:	<i>DS & JB</i>	
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.				
INSTRUMENT DETAILS				
Supplier:				
Make and Model:	<i>Pro DSS YSI</i>			
Serial Number:	<i>17H101156</i>			
CALIBRATION				
CALIBRATE WITH CALIBRATION SOLUTIONS				
Date and Time:	<i>7:24am 27/06/18</i>			
Parameter	Acidity		Conductivity	<i>Redox - Dissolved Oxygen (mV)</i>
Units	pH	pH	μS/cm	ppm
Calibration Standard Concentration:	<i>20°C @ 7.02</i>	<i>20°C @ 4.01</i>	<i>25°C @ 58.0</i>	<i>15°C @ 251</i>
Calibration Reading:	<i>14.9°C @ 7.01</i>	<i>15.1°C @ 3.59</i>	<i>15°C @ 444.06</i>	<i>20°C @ 240</i>
Calibration Temperature:	<i>7.01</i>			
ONGOING CHECKS				
BUMP TEST WITH CALIBRATION SOLUTION				
Date and Time:				
Parameter	Acidity		Conductivity	Dissolved Oxygen
Units	pH	pH	μS/cm	ppm
Calibration Standard Concentration:				
Bump Test Reading:				
Bump Test Temperature:				
COMMENTS				
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.				
Approval and Distribution				
<input type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.				
 _____ Fieldwork Staff Signature		<i>27/06/18</i> _____ Date		
Distribution: Project Central File				

FQM - Water Quality Meter Calibration Record

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beeliar Wetlands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:	Shannon DeMelo & D. Sullivan		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldworks.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:	Pro DSS Professional Series YSI				
Serial Number:	AH101156				
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:	16 May 2018 7:00 am				
Parameter	Acidity		Conductivity	(orp) - Dissolved Oxygen Redox(mv)	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:	4 @ 15°C	7 @ 25°C	999µS @ 25°C	12.88 @ 25°C	229 mV @ 25°C
Calibration Reading:	3.89	7.11	999.7		247.0
Calibration Temperature:	12.3°C	12.8°C	13°C		12.7°C
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
<p>- None</p> <p>- EC, pH, Redox calibrated.</p>					
Approval and Distribution					
<input checked="" type="checkbox"/> Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
_____ Fieldwork Staff Signature			_____ 16 May 2018 Date		
Distribution: Project Central File					

FQM - Water Quality Meter Calibration Record

Q4AN(EV)-410-FM1

Project Name:	Building Roe 8	Project Number:	60478410		
Project Location:	Beelar Wellands	Client:	Main Roads		
PM Name:	Chris McGraghan	Fieldwork Staff Name:	Shannon de Melo & Danni Sullivan		
This calibration record is intended to prompt fieldwork staff to calibrate water quality meter (WQM) daily before the start of fieldwork.					
INSTRUMENT DETAILS					
Supplier:					
Make and Model:					
Serial Number:					
CALIBRATION					
CALIBRATE WITH CALIBRATION SOLUTIONS					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen <i>Redox (mV)</i>	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:			58.0 @ 25°C		
Calibration Reading:			43018		
Calibration Temperature:			11.6°C		
ONGOING CHECKS					
BUMP TEST WITH CALIBRATION SOLUTION					
Date and Time:					
Parameter	Acidity		Conductivity	Dissolved Oxygen	
Units	pH	pH	µS/cm	ppm	ppm
Calibration Standard Concentration:					
Bump Test Reading:					
Bump Test Temperature:					
COMMENTS					
Detail any equipment faults, minor maintenance performed, change of batteries or technical support provided.					
Approval and Distribution					
Each individual instrument has been inspected and calibrated daily and bump tested as required by fieldwork staff.					
Fieldwork Staff Signature			Date		
Distribution: Project Central File					