Metropolitan Road Improvement Alliance

Roe Highway Extension

Addendum to Wetlands Monitoring and Management Plan

28 March 2019

Document Approval

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A	02/11/2018	S. De Melo	L. Kirchner	J. Shaw		
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Signature:						
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Signature:						
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Signature:						

Revision Recording

Revision	Details
A	Internal drafting
B	Revised as per internal review
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D	Final for issue
0	Update as per EPA comments

1 PURPOSE

The Wetlands Monitoring and Management Plan (WMMP) is implemented to protect and monitor inland water quality during and post-construction of the Roe Highway Extension (the Project). The WMMP was approved prior to changes being made to the Project's active construction area. There are 27 surface water and groundwater locations that are monitored fortnightly under the WMMP. Out of the 27 locations, 18 are located where there is no current or planned construction activity i.e. they are 'reference' bores. The purpose of this addendum is to match the monitoring frequency at these locations to a level that corresponds with current activity levels and to concentrate monitoring at locations where environmental impacts may occur i.e. 'impact' bores.

This addendum is also issued to amend the triggers to correct errors in baseline values.

1 INTRODUCTION

1.1 Project Background

Main Roads Western Australia (MRWA) established the 'Building Roe 8 Alliance' to complete Stage 8 of the Roe Highway Extension project, which had received approval by the Western Australian Minister for Environment in 2015 under the Ministerial Statement 1008 (MS 1008). Following the election of the Labour Government on 11 March 2017, construction of Roe 8 was suspended. In response, the funds were re-allocated to several projects to improve road safety and reduce congestion. One of the projects is the Murdoch Drive Connection (MDC), which is being delivered by MRWA through the Metropolitan Road Improvement Alliance (MRIA). The MDC is being carried out under MS 1008 and therefore is subject to all management plans required under MS1008 conditions of approval.

The WMMP was written in October 2016, and approved under the MS 1008, and has been implemented during the construction of the MDC. MRWA is seeking to reduce the monitoring frequency in the WMMP locations where there is no active construction (outside the MDC project to the west of Bibra Drive). There is no environmental benefit to the continued frequency of monitoring in this area. As per Condition 9-6 below the WMMP can be revised to the requirements of or as directed by the CEO.

1.2 MS 1008

Table 1 details the conditions for managing Wetlands (Inland Water Environmental Quality) in MS 1008.

Table 1. Condition requirements under MS 1008 for Annual Condition Report

Condition	Requirement
9-1	The proponent shall ensure that impacts to wetland quality associated with the implementation of the proposal are minimised, through implementation of conditions 9-2 to 9-9.
9-2	The proponent shall undertake a Baseline Wetland Condition Survey prior to commencement of construction to the requirements of the CEO on advice from the Department of Parks and Wildlife and the Department of Water. The Baseline Wetland Condition Survey shall:
	1. have regard for Ramsar wetlands within the broader Beeliar Wetlands system;
	2. cover Bibra Lake, Roe Swamp and North Lake areas adjacent to the road;
	3. identify the indicators of wetland quality including physicochemical parameters and bio-indicators; and
	4. include protocols to measure the indicators of wetland quality as identified in condition 9-2(3) including duration, timing and frequency.
9-3	Prior to commencement of construction, the proponent shall report the results of the Baseline Wetland Condition Survey required by condition 9-2 to the CEO.
9-4	Prior to commencement of construction, the proponent shall prepare a Wetlands Monitoring and Management Plan to the requirements of the CEO, on advice from the Department of Parks and Wildlife and the Department of Water. The Wetlands Monitoring and Management Plan shall:
	1. when implemented, substantiate whether condition 9-1 is being met;
	2. include the location of monitoring and reference sites;
	3. include protocols for monitoring the indicators as identified under condition 9-2(3);

Condition	Requirement
	4. determine the trigger levels for indicators of wetland quality to achieve the requirements of condition 9-1;
	5. include protocols for monitoring wetland quality against the trigger levels identified in condition 9-4(4); and
	6. identify management and contingency measures, including timeframes for their implementation, in the event that trigger levels identified under condition 9-4(4) are not met.
9-5	Prior to commencement of construction, the proponent shall implement the approved Wetlands Monitoring and Management Plan, and continue implementation until otherwise agreed by the CEO.
9-6	The proponent may review and revise the Wetlands Monitoring and Management Plan to the requirements of the CEO.
9-7	The proponent shall review and revise the Wetlands Monitoring and Management Plan as and when directed by the CEO.
9-9	In the event that the monitoring indicates that the trigger criteria specified in the Wetlands Monitoring and Management Plan have been exceeded the proponent shall:
	1. Immediately implement the management and/or contingency actions specified in the Wetlands Monitoring and Management Plan and continue implementation of those actions until the trigger criteria are being met, or until the CEO has confirmed by notice in writing that it has been demonstrated that the outcome in condition 9-1 is being and will continue to be met and implementation of the management and/or contingency actions is no longer required;
	2. Investigate to determine the likely cause of the trigger criteria being exceeded and to identify any additional contingency actions required to prevent the trigger criteria being exceeded in the future
	3. Provide a report to the CEO within seven days of an event, referred to in condition 9-9, occurring. The report shall include: a. details of management and/or contingency actions implemented; and b. the findings of the investigation required by condition 9-9(2).
9-10	The proponent shall submit the monitoring results required by condition 9-4, referenced against the environmental quality objective specified in condition 9-1 and the trigger levels specified in condition 9-4(4), to the CEO as part of the annual compliance reporting required by condition 4.
9-11	The Wetlands Monitoring and Management Plan required by condition 9-4 shall be made publicly available in a manner approved by the CEO.

1.3 Amendments

This addendum proposes the following amendments to the WMMP:

1. Amendment to the monitoring program (WMMP Section 2.3) with reference to:
   - inaccessible bores/locations (see Section 2.1 and 2.2)
   - assignment of 'impact' and 'reference' at groundwater bores (see Table 2 in Section 2.1)
   - monitoring frequency (see Section 3)
2. Amendment to correct errors in the baseline values (see Section 4).

1.4 Justification

The WMMP has a total of 14 surface water locations and 13 groundwater bores. Out of these, 10 surface water locations and eight groundwater bores are located where active construction has not and will not occur. These monitoring locations are in Bibra Lake, North Lake and Lower Swamp (Frog Swamp) (figures 3 and 4 in Section 2.3 of the WMMP).

An analysis of the baseline and post-construction data was undertaken in the Annual Condition Report 2018, under the WMMP (Annual Report). The purpose of the Annual Report was to summarise the results of monitoring from 2 July 2017 to 1 July 2018, however it also included historical data (from September 2015) to characterise wetland conditions (MRIA 2018).

Considering data from September 2015 to July 2018, it was concluded that project activities were not impacting on inland water quality. Exceedances were determined to be within the natural and seasonal variation of the wetlands. Quarterly monitoring at locations where there is no current or planned construction activities should be sufficient for the protection of inland waters from project impacts.

2 AMENDMENT TO MONITORING PROGRAM

2.1 Groundwater

This section amends the assignment of 'impact' and 'reference' labels for groundwater bores in Figure 4 (Section 2.3) and in Appendix 2 of the WMMP. Groundwater bores are assigned as 'impact' or 'reference', depending on their location from proposed construction activities. Exceedances at 'reference' bores are unlikely to be caused by project activities and are used to help characterise the conditions of the wider area.

Given the area of active construction has changed, the assignment of 'impact' and 'reference' should be adjusted. Additionally, there are two bores that are inaccessible and will need to be removed from the program. These changes are shown in Figure 1.

This addendum amends the assignment of 'impact' and 'reference' for groundwater bores, as shown in Table 2:

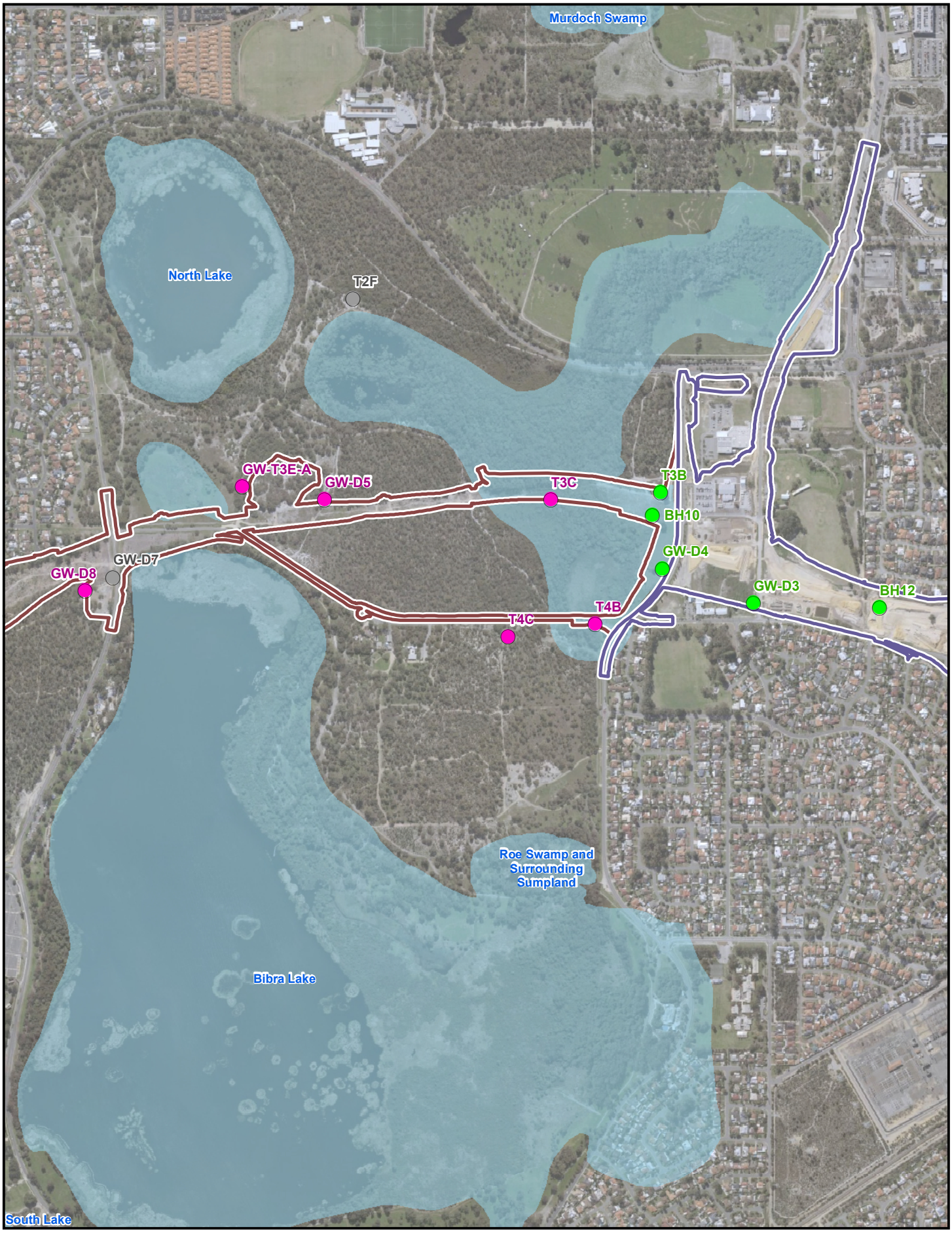
Table 2. Changes to Impact/Reference Bores

Monitoring Bore	Type listed WMMP	Changes to WMMP	
		Updated	Justification
GW-T2F	Impact	Remove from WMMP	GW-T2F and GW-D7 have been permanently destroyed. Re-drilling is not necessary as they are not located near construction activities. Surrounding bores should be sufficient for the monitoring programGW-T2F and GW-D7 have been permanently destroyed. Re-drilling is not necessary as they are not located near construction activities. Surrounding bores should be sufficient for the monitoring program
GW-D7	Impact		
GW-T3B	Impact	List as impact	These bores are within the active construction area and should be considered 'impact' bores.
BH10	Impact		
BH12	Reference		
GW-D3	Impact		
GW-D4	Impact		
GW-T3C	Impact	List as reference	These monitoring bores are located to the west of Bibra Drive, where active construction will not occur. Further fortnightly sampling at these locations provides no environmental benefit to protecting the wetlands or water quality.
GW-T4B	Reference		
GW-T4C	Reference		
GW-D5	Impact		
GW-D8	Impact		
GW-T3E-A	Impact		

2.2 Surface Water

This addendum removes monitoring location A1E from the WMMP, due to:

A1E is the only surface water location that is inaccessible. This monitoring location is in the centre of the North Lake wetland and is either not sampled or the location is altered due to health and safety reasons. Given there are three other monitoring locations at North Lake, A1E is not necessary for monitoring potential impacts and should be removed from the program. Surface water monitoring locations are displayed in Figure 2.



PROJECT ID 60478410
CREATED BY DGF/RNM
APPROVED BY JShaw
LAST MODIFIED 19 DEC 2018

Metropolitan Road Improvement Alliance

N

DATUM GDA 1994, PROJECTION PERTH COASTAL GRID 1994

0 130 260 390 520
metres

1:12,500 when printed at A4

Legend

- Rehabilitation Zone
- Construction & Operation Zone
- Wetlands
- Groundwater Monitoring Location - Impact (Fortnightly Monitoring)
- Groundwater Monitoring Location - Reference (Quarterly Monitoring)
- Groundwater Monitoring Location - Removed

Data sources:

Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010).

Wetland Groundwater Monitoring Locations

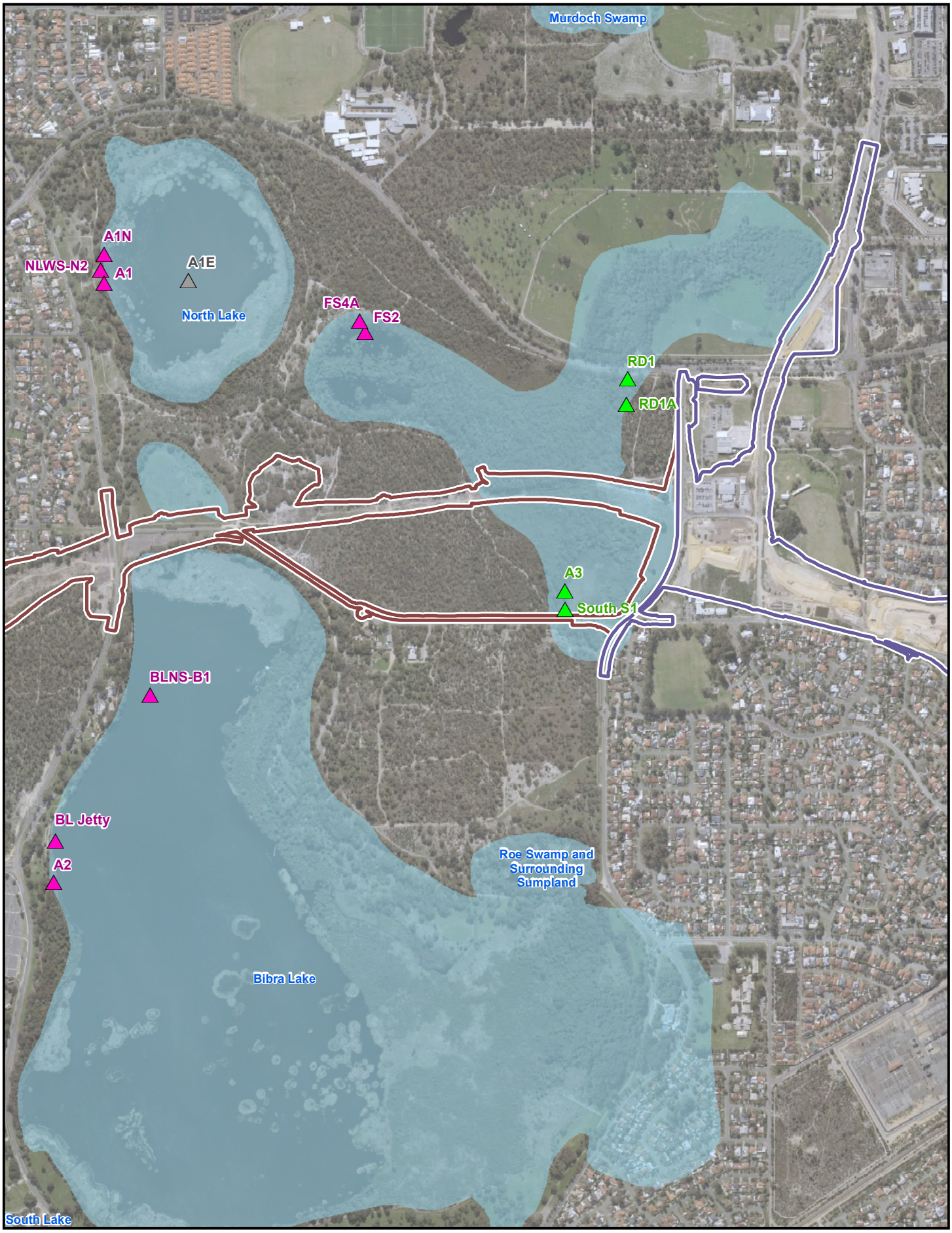
MAIN ROADS WESTERN AUSTRALIA

ROE HIGHWAY EXTENSION WETLANDS MONITORING AND MANAGEMENT PLAN

Figure 1

Map Document: G:\Client_Data\MRIA\10_Murdoch Drive Connection\02_MXDs\20181211_WetlandMonitoringFigures\Fig3_GroundwaterMonitoring.mxd (wyattk2)

A4 size



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Legend

- Rehabilitation Zone
- Construction & Operation Zone
- Wetlands
- Surface Water Monitoring Location - Impact (Fortnightly Monitoring)
- Surface Water Monitoring Location - Reference (Quarterly Monitoring)
- Surface Water Monitoring Location - Removed

Data sources:

Base Data: (c) Based on information provided by and with the permission of the Western Australian Land Information Authority trading as Landgate (2010).

Wetland Surface Water and Sediment Monitoring Locations

MAIN ROADS WESTERN AUSTRALIA

ROE HIGHWAY EXTENSION WETLANDS MONITORING AND MANAGEMENT PLAN

Figure 2

Map Document: G:\Client_Data\MRIA\10_Murdoch Drive Connection\02_MXDs\20181211_WetlandMonitoringFigures\Fig4_SurfaceWaterMonitoring.mxd (wyattk2)

A4 size

3 AMENDMENT TO MONITORING FREQUENCY

3.1 Amendment to wording in WMMP

The monitoring frequency is described in Section 2.3 of the WMMP, and is shown in the *black italicised* text below. Changes to the wording are marked in *red italicised* text.

This addendum amends the wording in Section 2.3 of the WMMP, to:

> *The monitoring program will commence prior to the commencement of construction and continue until otherwise agreed by the CEO of OEPA.*
>
> *Monitoring will generally occur at the following frequencies (unless otherwise specified in Table 4, Table 5 and Table 6).*
>
> *Monitoring in active construction area:*
>
> *~~Surface and groundwater monitoring:~~*
>
> - *field monitoring – fortnightly during construction then quarterly post-construction*
> - *monitoring requiring laboratory analysis – monthly ~~quarterly~~ during construction and quarterly post-construction.*
>
> *Monitoring outside active construction area:*
>
> - *field monitoring – quarterly during construction and post-construction*
> - *monitoring requiring laboratory analysis – quarterly during construction and post-construction.*
>
> *Sediment and macroinvertebrate monitoring:*
>
> - *annually during construction and post-construction*.

3.2 Amendment to monitoring program

MRWA is proposing to reduce the frequency of field monitoring and laboratory analysis at locations where there is no active construction. The Annual Report 2018 identified that the Project has not had an impact on inland water quality, and that continued fortnightly monitoring at these locations provides no environmental benefit to the wetlands.

MRWA proposes that the frequency of monitoring at locations outside the active construction area to be reduced from fortnightly to quarterly.

This addendum amends the monitoring frequency at groundwater and surface water locations as shown in Table 3, to:

Table 3. Changes to monitoring frequency

Location		Updated Monitoring Frequency during construction	
Groundwater		**Field monitoring**	**Laboratory Analysis**
Impact	GW-T3B	Fortnightly (no change)	Monthly (no change)
	BH10		
	BH12		
	GW-D3		
	GW-D4		
Reference	GW-T3C	Quarterly	Quarterly

	GW-T4B		
	GW-T4C		
	GW-D5		
	GW-T3E-A		
	GW-D8		
Surface Water		**Field monitoring**	**Laboratory Analysis**
Roe Drain	RD1	Fortnightly (no change)	Monthly (no change)
	RD1A		
Roe Swamp	A3		
	S1		
Bibra Lake	BLNS-B1	Quarterly	Quarterly
	A2		
	A2S		
	BL_Jetty*		
Frog Swamp	FS2		
	FS4A		
North Lake	NLWS-N2		
	A1		
	A1N		

*BL_Jetty is subject only to field monitoring (no laboratory analysis)

4 AMENDMENT TO CORRECT ERRORS IN BASELINE VALUES

Some errors are also apparent in the Baseline Analysis Report (BAR) (Aurecon, 2016) triggers as they are presented in the WMMP (Strategen, 2016). These relate to conversion errors, for unfiltered iron for North Lake and total dissolved solids (TDS) for all surface water locations.

Unfiltered iron for North Lake incorrectly stated in the WMMP as 13.6 µg/L, which should be 13.6 mg/L or 13,600 µg/L, as is recorded in the Baseline Analysis Report (Aurecon, 2016).

Total dissolved solids (TDS) was measured for the BAR in-situ as mg/L, calculated from conductivity in mS/cm and temperature. For presentation in the WMMP, Strategen have converted conductivity values, but not the associated TDS values. The incorrect conversion used in the WMMP has resulted in a TDS trigger range for each surface water body which is incorrect and they needs to be updated to align with the correct conversion.

The EC multiplied by 0.65 is the standard conversion from EC to TDS (Aurecon, 2016). Corrections to the calculations are marked in *red italicised* text.

Table 4. Changes to conversion of EC to TDS

Parameter	Groundwater	Bibra Lake	North Lake	Frog Swamp	Roe Drain	Roe Swamp
Electrical Conductivity (µS/cm)	274-1199	1499-6393	1711-4040	737-8130	400-700	344-451
Total Dissolved Solids (mg/L)	178-780 (correct)	1.08-4.3 *974-4155*	1.25-3.55 *1112-2626*	0.522-723 *479-5284*	0.283-0.641 *260-455*	0.283-0.641 *223-293*

5 REFERENCES

American Public Health Association 1992. *APHA Method 2510B: Standard Methods for the Examination of Waste and Wastewater, (APHA 2510)*.

Aurecon 2016. *Roe Highway Extension 247607 Baseline Analysis Report – Rev0,* dated October 2016.

Metropolitan Roads Improvement Alliance, 2018. *Annual Condition Report Wetlands Monitoring and Management Plan Ministerial Statement 1008 (Annual Report)*, dated September 2018.

Strategen 2016*. Roe 8 Highway Extension – Wetlands Monitoring and Management Plan – Rev 4 (WMMP)*, dated October 2016.