GLEVAN CONSULTING

Phytophthora Dieback Occurrence Report for Anketell Road

Prepared for Westport Roads IPT

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This report has been prepared in accordance with the scope of work agreed between Westport Roads IPT and Glevan Consulting and contains results and recommendations specific to the agreement. Results and recommendations in this report should not be referenced for other projects without the written consent of Glevan Consulting.

Procedures and guidelines stipulated in various manuals, particularly Phytophthora Dieback Interpreters Manual for lands managed by the Department (DBCA), are applied as the base methodology used by Glevan Consulting in the delivery of the services and products required by this scope of work. These guidelines, along with overarching peer review and quality standards ensure that all results are presented to the highest standard.

Glevan Consulting has assessed areas based on existing evidence presented at the time of assessment. The Phytophthora pathogen may exist in the soil as incipient disease. Methods have been devised and utilised that compensate for this phenomenon; however, very new centres of infestation, that do not present any visible evidence, may remain undetected during the assessment.

Executive Summary

Glevan Consulting was commissioned by Westport Roads IPT to conduct a Phytophthora Dieback assessment to determine the disease status of Anketell Road. The Project Area totalled 224.83 hectares (ha), with 150.32 ha assessed. The Project Area spanned between Riseley Road in the west and Treeby Road in the east. The assessment was carried out in accordance with the Phytophthora Dieback Interpreter's Manual for lands managed by the Department of Biodiversity, Conservation and Attractions (DBCA) (Department of Parks and Wildlife, 2015).

The assessment was conducted between the 3rd to the 6th of June 2025 by Shannon Hewitt of Glevan Consulting. Of the 150.32 ha, 32.75 ha were classed as Uninfested with adequate amounts of susceptible species being present. A further 16.05 ha were deemed Permanently Uninterpretable due the overall lack of sufficient indicators, 101.55 ha were Excluded due to the complete lack of natural vegetation most commonly found in cleared areas and industrial zones. The remaining 74.51 ha was categorised as Unknown; these areas were commonly found within private business land where access was not granted during the course of the assessment. As no symptoms consistent with Phytophthora Dieback were observed during the assessment, all areas are considered to be Protectable.

Five soil and tissue samples were taken within the bushland between Investigator Drive and Anketell Road. All of which have which have since returned negative results for *Phytophthora cinnamomi.*

The validity of the hygiene boundaries mapped for this project is twelve months from the completion of the assessment.

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Glossary

Assessment Area	The portion of the Project Area where Phytophthora occurrence assessment is possible or will be possible after vegetation recovery.
Biomass	The total quantity or weight (density) of organisms in a given area.
Buffer	The area between the edge of visible disease symptoms and demarcation.
Clean On Entry	A requirement at a defined, signposted point where entering machinery and vehicles are to be free of soil, plant, and other material to minimise the risk of spreading weeds, pests and diseases.
DBCA	Department of Biodiversity, Conservation and Attractions.
Demarcation	The physical installation and representation of boundaries between hygiene categories after interpretation.
Phytophthora Dieback	The disease of plants caused by infection by the soil-borne organisms of the genus *Phytophthora*, of which *P. cinnamomi* is the most widespread and destructive.
Disease Impact	The degree of harm caused by Phytophthora Dieback (high, moderate, low).
Excluded Area	An area of high disturbance where natural vegetation is unlikely to recover.
Host	A plant species that may be Infested with the pathogen but not cause disease.
Indicator Species	Plant species susceptible to Phytophthora disease and reliably show early symptoms.
Infection	The invasion of the disease to an individual plant and not the population.
Infestation	The invasion of the disease into a population of plants.
Infested	An area that a registered interpreter has determined is expressing disease symptoms that indicate the presence of the pathogen *Phytophthora cinnamomi*.
Incipient Disease	A disease that is not visibly symptomatic.
Interpretation	Determining disease presence or absence in natural ecosystems using observable factors.
Not Yet Resolved	Phytophthora occurrence diagnosis cannot be made because of inconsistent evidence.
Pathogen	Phytophthora species.
Phytophthora Occurrence Assessment	The entire scope of work that relates to the delivery of a Phytophthora occurrence map and report.
Permanently Uninterpretable	A natural area with inadequate visible symptoms present to make a diagnosis.
Project Area (Study Area)	The proponent's area of interest, including the area where disturbance activities could occur, including access and egress to activity areas.
Protectable Area	Portions of the Project Area over which hygiene management rules for the plant pathogen *Phytophthora*, including clean on entry, will apply. These areas are generally free of disease.
Susceptible	Likely or liable to be harmed by Phytophthora pathogen.
Uninfested	An area that a registered interpreter has determined may be free of plant disease symptoms that indicate the presence of the pathogen *Phytophthora cinnamomi*.
Temporarily Uninterpretable	A naturally vegetated area that has had disturbance and is likely to recover from that disturbance in the short term.
Unprotectable	A disease-free area that is likely to become infested within a given time.
Vector	Any agent that acts as a carrier or transporter.

1 Introduction

Glevan Consulting was commissioned by Westport Roads IPT to conduct a Phytophthora Dieback assessment to determine the disease status of land associated with the Anketell Road upgrade. The Project Area totalled 224.83 hectares (ha), spanning from Riseley Rd in the west to Treeby Road in the east.

The Phytophthora Dieback occurrence assessment was completed in June 2025 by Miss Shannon Hewitt. Miss Hewitt is accredited by the Department of Environment and Conservation in the detection, diagnosis and mapping of the Dieback disease (Interpreter Registration No: DPW PDI 45). This accreditation recognises the skills and experience of Miss Hewitt.

Phytophthora Dieback occurrence categories assigned as part of this assessment are valid for a period of 12 months from the date of survey.

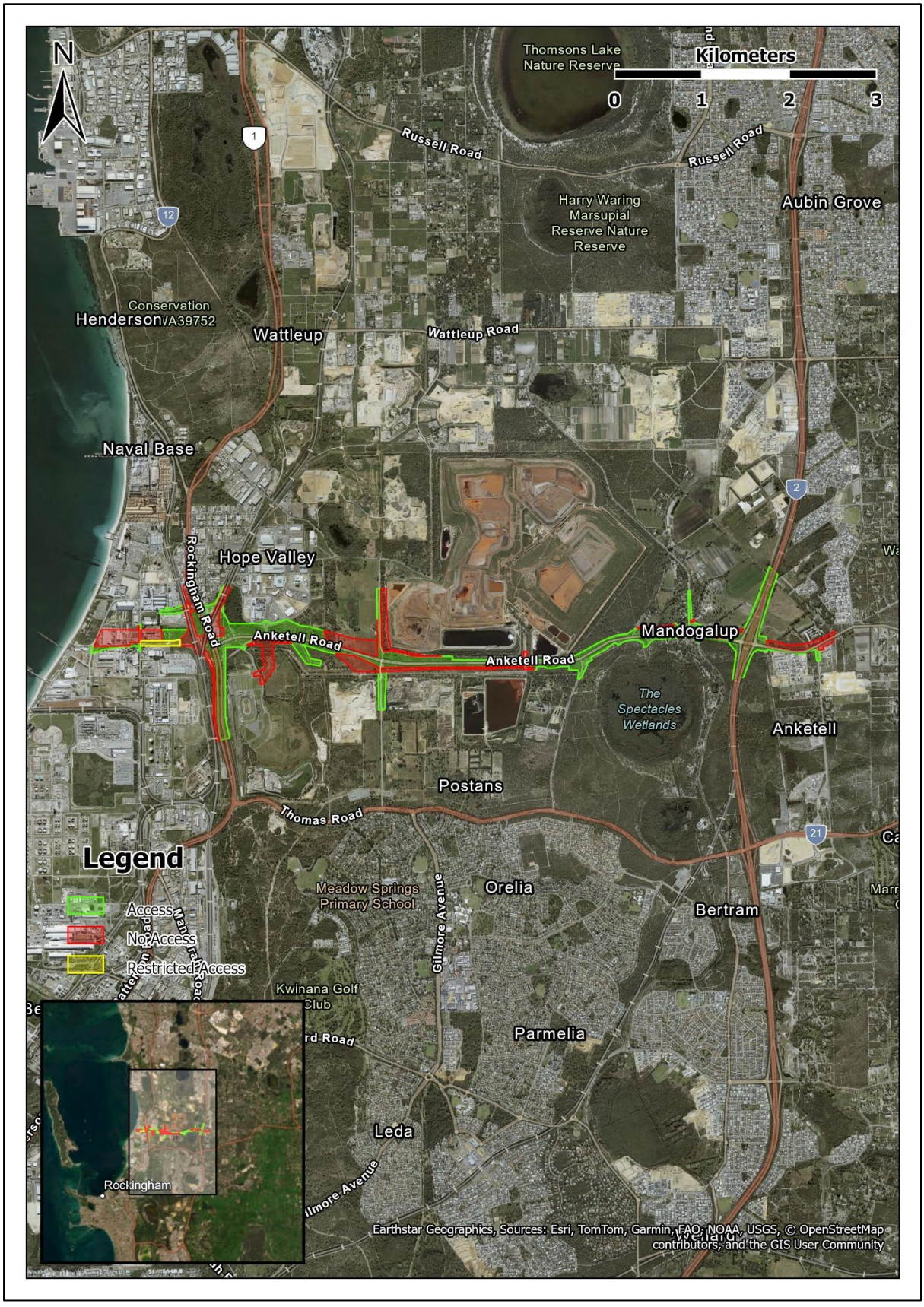

Figure 1 – Project Area location, including access restrictions.

2 Background – Phytophthora Species and Dieback Disease

Thousands of Australian native plant species are susceptible to Phytophthora Dieback (Dieback), a disease caused by the pathogen *Phytophthora cinnamomi* and other *Phytophthora* species. Whilst many root pathogens that cause disease are present within the Australian landscape, *Phytophthora cinnamomi* has caused the most significant impact to date and poses the biggest threat (Commonwealth of Australia, 2018). This disease is a significant threat to Australia's biodiversity, placing important plant species at risk of death, local extirpation or even extinction. Its impact on plant communities can also result in major declines in some insect, bird and animal species due to the loss of shelter, nesting sites and food sources. Phytophthora Dieback can cause permanent damage to ecosystems. Once an area is Infested with the pathogen, eradication is usually impossible. Awareness that human activity can easily spread the pathogen will help prevent an increase in the extent of this disease (Commonwealth of Australia, 2018).

P. cinnamomi is one of at least 32 *Phytophthora* species that exist in Australia. Whilst *P. cinnamomi* has to date had the largest impact on the Western Australia vulnerable zone, other destructive *Phytophthora* species are emerging in Australia such as *P. arenaria, P. constricta, P. cryptogea, P. elongata, P. gregata, P. megasperma* and *P. multivora. P. multivora* is notable in having been linked to declines in vegetation within the Western Australian vulnerable zone (Commonwealth of Australia, 2018).

P. cinnamomi is a microscopic water mould that belongs to the class Oomycetes. Oomycetes organisms are filamentous and absorptive and reproduce both sexually and asexually. *Phytophthora* species are considered parasitic, behaving largely as a necrotrophic pathogen causing damage to the host plant's root tissues because of infection and invasion (Department of Parks and Wildlife, 2015). The pathogen infects a host when it enters at a cellular level and damages the cell structure.

Dieback is the result of interaction between three physical components forming a 'disease triangle': the pathogen (*Phytophthora* species), the environment and the host. All three components are needed for the disease to develop over time. A population of hosts is made up of susceptible, infected and immune or resistant individuals.

The relationship between the presence of *Phytophthora* and the development of Dieback disease is variable based on the susceptibility of native plant species and the different environmental characteristics, landform types and rainfall zones across bioregions.

The plant host is a highly variable part of the disease triangle. Assessment sites may range from having no susceptible hosts present through to almost all plants present in the environment demonstrating high levels of susceptibility to *P. cinnamomi*. Over 2000 potential host species for the *P. cinnamomi* pathogen exist in Western Australia alone (Commonwealth of Australia, 2018). Skilled Dieback Interpreters are able to observe and interpret disease presence using hundreds of different susceptible plant species (referred to as indicator species) across multiple vegetation communities. Interpreters are able to recognise when disease detection is not possible due to insufficient hosts being present within an area.

Within the vulnerable zone of Western Australia, three main family groups are regarded as highly susceptible to Phytophthora Dieback disease:

1. Proteaceae
2. Ericaceae
3. Xanthorrhoeaceae.

The Proteaceae plant family demonstrates a high level of susceptibility to the *Phytophthora cinnamomi* pathogen. Genera such as *Banksia*, *Isopogon*, *Adenanthos, Persoonia, Petrophile* and *Xylomelum* demonstrate high susceptibility, providing reliable indicators through much of the vulnerable zone of Western Australia. *Andersonia, Astroloma* and *Leucopogon* species from the Ericaceae family also demonstrate high levels of susceptibility, whilst other species within the family do not demonstrate the same level of vulnerability to the pathogen. All species contained in the Xanthorrhoeaceae family are considered to be reliable indicator species.

Not all species within the vulnerable zone of Western Australia are susceptible to Dieback, with some species demonstrating a resistance to the pathogen. Resistance to the pathogen is recognised within genera such as *Acacia, Calothamnus, Eucalyptus* (excluding *Eucalyptus marginata*), *Lepidosperma* and *Melaleuca*, among others. Resistance to *P. cinnamomi* is dependent on a multitude of factors such as the ability for a species to compartmentalise the infected part of a root or the plants ability to quickly regrow new roots in order to replace those infected by the pathogen (Commonwealth of Australia, 2018). It has been recognised under field conditions that herbaceous perennials, annuals and

geophytes demonstrate greater resistance to Phytophthora Dieback compared to woody perennials (Commonwealth of Australia, 2018).

Where species considered to be resistant to the *P. cinnamomi* pathogen are observed to be dying suddenly, Armillaria Rot Disease (ARD) may be considered to be the cause of death. ARD is caused by the *Armillaria luteobubalina* fungus. Drought conditions are another contributing cause of death other than ARD to Phytophthora resistant species.

Temperature, rainfall and soil type all affect the impact that Dieback has on an area. *P. cinnamomi* does not generally cause significant vegetation declines in areas that receive less than 400 millimetres of rain annually and occur north of latitude 30º (O'Gara et al., 2005 as cited in Commonwealth of Australia, 2018). Within Western Australia, the vulnerable zone exists in areas of Mediterranean climate (warm to hot, dry summers and mild to cool, wet winters) where annual rainfall exceeds 400 millimetres in the southwest of Western Australia. The most significant impact of the pathogen is observed in areas receiving an annual rainfall of above 800 to 1000 millimetres.

Soil characteristics also play a significant role in the occurrence of Dieback. Moisture is essential for the survival of the *Phytophthora* pathogen and for sporangia production, with wet soil conditions and warm temperatures favouring the release of motile zoospores from the sporangia. Optimal temperatures for the survival and reproduction of the pathogen are between 21ºc to 30ºc, a temperature range that is common through the vulnerable zone of Western Australia (Department of Parks and Wildlife, 2015). The growth and reproduction of the pathogen is also affected by soil pH, with a favourable pH range of between five and six (mildly acidic). Strong host resistance is observed in areas with a high level of soil fertility, creating a less favourable soil environment for the pathogen.

Whilst autonomous (active) spread of the disease does occur, *P. cinnamomi* is passively spread (or vectored) by animals and human activity via the movement of soils, allowing the rapid infestation of a new area by the pathogen. The movement of even small pieces of vegetation or soil containing viable inoculum (zoospores, chlamydospores, oospores) can result in the spread of the pathogen. Passive spread by a vector can occur both overland and in subsurface water flow (Commonwealth of Australia, 2018). Human induced spread of the *P. cinnamomi* pathogen is a significant risk in the Western Australian landscape. Activities such as road construction and maintenance, commercial activities (timber harvesting and mining), off-road vehicle movement and bush walking activities can result in the spread of the disease should movement of Infested soil occur.

3 Materials and Methods

3.1 Project Area

Areas within the Project Area were categorised as Excluded if the vegetation was suffering from significant disturbance. Significant disturbance is based on Vegetation Condition Scale (Keighery, 1994) shown in Table 1. Any remaining area was categorised post-assessment into Phytophthora Dieback occurrence categories (Table 2).

Table 1 – Keighery Vegetation Condition Scale and Assessability (Department of Parks and Wildlife, 2015).

Assessability	Scale		Vegetation Condition
Assessable	1	Pristine	Pristine or nearly so; no obvious signs of disturbance.
	2	Excellent	Vegetation structure intact; disturbance affecting individual species and weeds are non-aggressive species.
	3	Very good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Possibly assessable – Discretion required	4	Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.
Not assessable – Excluded from assessment	5	Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
	6	Completely degraded	The structure of the vegetation is no longer intact, and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees or shrubs.

Table 2 – Phytophthora Dieback Assessment for Vegetation Condition.

Vegetation Condition	Phytophthora Occurrence Category
Naturally vegetated areas. Keighery disturbance rating of 3 or less Phytophthora occurrence categorisation is possible.	Infested - Determined to have plant disease symptoms consistent with the presence of *Phytophthora cinnamomi.*
	Uninfested - Determined to be free of plant disease symptoms that indicate the presence of *P. cinnamomi*
	Permanently Uninterpretable - Undisturbed areas where susceptible plants are absent, or too few to make a determination of the presence or absence of *P. cinnamomi.*
	Not yet resolved.
Vegetation structure temporarily altered.	Temporarily Uninterpretable - Areas of disturbance where natural vegetation is likely to recover.
Vegetation structure severely altered. Keighery disturbance rating 4 or greater. Phytophthora occurrence assessment is not possible	Excluded.

3.2 Assessment Method

Prior to assessment, all information relevant to the assessment was assembled to assist the interpretation process. This information included previous assessments of the area, historic sample results, history of burning and possible other disturbances. This process is referred to as the Desktop Assessment.

All Phytophthora Dieback detection, diagnosis and mapping are performed to standards and procedures defined in *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (Department of Parks and Wildlife, 2015). These procedures are grounded on the presence of indicator species in the vegetation, and the observance of deaths in these plants. An indicator species is a plant species that is reliably susceptible to *Phytophthora cinnamomi*. Indicator Species Deaths (ISDs) alone do not necessarily indicate disease presence, and it is necessary to consider all environmental and ecological factors that may be present. These other factors include:

- Chronology of deaths,
- Pattern of deaths,
- Topographical position,
- Vectoring – causal agencies, and

- Biomass and biological diversity reduction.

Other causes of plant deaths need to be considered when determining the presence of Phytophthora Dieback (Department of Parks and Wildlife, 2015), including:

- Armillaria Root Disease,
- Various cankers,
- Insects,
- Drought, wind scorch and frost,
- Salinity and waterlogging,
- Fire and lightning,
- Senescence and competition,
- Physical damage, and
- Herbicides and chemical spills.

The Phytophthora Dieback assessment process is undertaken using the following basic sequence as documented in *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (Department of Parks and Wildlife, 2015):

- Observe,
- Hypothesise,
- Undertake evidence collection,
- Form a diagnosis,
- Test the diagnoses (sample results, previous assessment, second assessment),
- Evidence is reviewed with a new hypothesise formed, if necessary,
- Final field diagnoses determined.

The assessment was conducted using the methodology of a mixture of both comprehensive and linear assessments methodologies.

3.3 Other Phytophthora Species

Phytophthora species other than *P. cinnamomi* are identified using DNA analysis by the Centre for Phytophthora Science and Management (CPSM) at Murdoch University following the identification of the presence of a *Phytophthora* species in baiting analysis performed by Vegetation Health Service (VHS) at the Department of Biodiversity, Conservation and Attractions (DBCA).

3.4 Collection of Evidence of Phytophthora Dieback

During the assessment process, the collection of evidence to support the field diagnosis was recorded using a tablet running the ESRI Field Maps application. Waypoints are recorded at locations to show evidence of:

- Where field diagnosis is certain or almost certain of Phytophthora Dieback infestation,
- Healthy indicator species where field diagnosis is almost certain of the site being Uninfested,
- Sites with too few or devoid of indicator species, thus supporting Permanently Uninterpretable classification, or
- Areas of disturbance, which are Temporarily Uninterpretable or Excluded.

Additional waypoints recorded include:

- Points requiring soil and tissue sampling,
- Points located where samples have been taken,
- Points located at indicator species deaths, and
- Points that need to be revisited for further examination.

Evidence recorded during a comprehensive assessment is collected along a series of transect lines spaced 50 meters apart, with evidence collected no more than every 100 meters along the transect lines. Linear assessments represented by an assessment area 25 meters either side of the centre line are assessed using a minimum of a single pass on each side of the centre line. Assessment areas that exceed 25 meters either side of the centre line are either assessed using the methodology of a comprehensive assessment or additional transect lines are established parallel to the centre line at increments of 50 meters.

Waypoint evidence, sample sites and results, and field demarcations are then digitised into a Phytophthora Dieback Occurrence Map according to the standards defined by the *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (Department of Parks and Wildlife, 2015).

3.5 Demarcation

The Phytophthora Dieback occurrence categories were demarcated in the field using the appropriate flagging tape (Table 3) tied to the vegetation at an appropriate buffer width. An appropriate buffer

width is determined by Interpreters during the course of the assessment, and takes into consideration the following:

- Natural autonomous spread of the pathogen,
- Likely presence of incipient disease,
- Potential for surface water to flow into an area from an infestation,
- Current rate of spread,
- Location of natural drainage lines, such as creeks and brooks,
- Other site factors, including soil types that increase or decrease the rate of spread and degree of slope.

At a minimum, an up-slope buffer of 15 meters and a down-slope buffer width of 25 meters will be applied.

Table 3 – Demarcation Flagging Colours.

Boundary	Tape Colour and Width
Phytophthora Dieback Infested	Fluoro pink 25 mm
Permanently Uninterpretable, Temporarily Uninterpretable and Excluded (when required)	Pink and black striped ('tiger tape') 25 mm
Permanently Uninterpretable against Excluded and Temporarily Uninterpretable	Double band pink and black tiger tape
Armillaria infestation	Not usually demarcated, but if required, double flagging of pink and black tiger tape and fluoro pink 25mm.

3.6 Soil and Tissue Samples

Soil and tissue samples taken during the assessment were to standards and prescriptions defined in *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (Department of Parks and Wildlife, 2015). While species specific sampling techniques were undertaken, the general process to collect a soil and tissue sample is as follows:

- Tools and equipment are checked for the presence of soil and plant matter. Sterilisation will have occurred at the completion of the previous sample. Re-sterilise if required.
- Using the sampling tool (long or short handle mattock), dig down to expose the stem base and roots of the target plant, to a minimum depth of 30 cm.

- Remove sections of the root material and stem base from all sides of the target plant and place into a plastic sample bag.
- Collect several handfuls of soil from different depths around the base of the target plant and place into the plastic sample bag.
- Complete two metal tags with the sample tag information, including project name, sample number, company details, sample date and Interpreter initials. Place one tag into the bag.
- Complete a paper tag with the above information and secure to the sample bag.
- Mark the location of the sample with flagging tape and secure the second metal information tag to a plant within the immediate vicinity of the flag.
- Record the sample location and required information as an evidence point using ESRI Field Maps.
- Remove any material from the sampling tools and sterilise.
- Store the sample(s) in a cool location away from direct sunlight until transported to the laboratory.

All samples were analysed in the Vegetation Health Services (DBCA) laboratory using best-practice techniques.

Taking a soil and tissue sample from dead and dying plants is an integral part of assessment – although in some cases sampling is not essential. Sample results provide evidence to support field diagnostic decisions. The following table (Table 4) shows the need for sampling to assist the disease diagnosis process.

Table 4 – Determination of Requirement for Sampling (Department of Parks and Wildlife, 2015).

Observable factors indicating likelihood of *Phytophthora cinnamomi* presence				
ISD type	Multiple	Cluster	Scattered	Isolated
Species	Some or most indicator species	Any indicator plant	Any indicator plant	Any indicator plant
Pattern development	Obvious			Not obvious
Chronology	Obvious			Not obvious
Topographic situation	Gully/flat	Lower to mid slope	Mid slope to upper slope	Ridge
Causal agent	Obvious			Not obvious
Requirement for soil and tissue sample	Low	High	High	Low

Samples may also be taken for the following strategic reasons:

- Supporting Infested field diagnosis,
- Incipient, subtle or cryptic disease in apparent Uninfested sites, or
- Altering mapped Infested area boundaries.

3.7 Determining Protectable Areas

Following the determination of Phytophthora Occurrence categories, all interpretable vegetation was assessed for protectability, using the Department of Biodiversity, Conservation and Attractions (DBCA) Protectable Areas criteria.

The *FEM047 Phytophthora Dieback Interpreter's Manual for lands managed by the department* (Department of Parks and Wildlife, 2015) defines 'Protectable Areas' as those that:

- Have been determined to be free of the pathogen Phytophthora spp. by a registered Dieback Interpreter (all susceptible indicator plant species are healthy and no plant disease symptoms normally attributed to Phytophthora Dieback are evident),
- Consists of areas where human vectors are controllable (e.g., not an open road, private property), and
- Are positioned in the landscape and are of sufficient size (e.g., > 4 ha with axis >100 m) such that a qualified Interpreter judges that the pathogen will not autonomously engulf them in the short term (a period of a few decades), or
- Includes areas of high conservation and/or socio-economic value (for example, a small Uninfested area with a known population of a susceptible species of Threatened flora).

Areas deemed Unprotectable are displayed on the Phytophthora Dieback Occurrence Map (See Section 7.1) as grey hashed areas. By default, all areas not displayed as Unprotectable on the Phytophthora Dieback Occurrence Map have been categorised as Protectable.

4 Results

4.1 Desktop Assessment

Landforms and Vegetation

According to the report by GHD (2024), the regional biogeography falls within the South West Botanical Province of Western Australia, specifically within the Swan Coastal Plain (SCP) bioregion and the Perth subregion (SWA02), as defined by the Interim Biogeographic Regionalisation of Australia (IBRA). The Perth subregion consists of colluvial and aeolian sands, alluvial river flats, and coastal limestone. Heath and Tuart woodlands typically occur on limestone, Banksia and Jarrah-Banksia woodlands on Quaternary marine dunes of varying ages, and Marri on colluvial and alluvial soils. The subregion also contains a complex network of seasonal wetlands.

Given that the documented landforms comprise calcarenite or limestone, it is highly unlikely that Phytophthora dieback would survive in these conditions, as limestone is known to restrict the spread of the pathogen. Therefore, any expression of the disease within this landform is expected to be minimal or absent. Vegetation within the Project Area includes Tuart woodlands, Banksia woodlands, and Spearwood shrublands. It is anticipated that several reliable indicator species will occur across most of the Project Area, and if *Phytophthora cinnamomi* were present, disease expression would likely range from distinct to subtle.

Fire History

Analysis of the DBCA Fire History (DBCA-060) database (Department of Biodiversity, Conservation and Attractions, 2025) indicates that there have been multiple fires recorded around Anketell Road over the years, some of examples include; a wildfire in 2021 on the southern end of the Project Area along Rockingham Road, a wildfire in 2014 which started approximately 600 metres west of McLaughlan Road and approximately 370 meters east of McLaughlan Road. A small wildfire was recorded in 2015 affecting Anketell Rd and Spectacles Drive. None of the documented fires around the Anketell Project Area have affected the infield assessment.

Historical Assessments

Review of Glevan Consulting's database does not show previous recoveries of *Phytophthora* from within or around the Project Area.

Rainfall

The long-term annual average rainfall (2002 to 2025) recorded at the nearby Anketell Weather Station is 792.80 mm (Bureau of Meteorology, 2025), which means the Project Area is located in the 600 mm and above zone, where Phytophthora Dieback occurrence would not be restricted and would be expected to occur across the landscape.

4.2 Phytophthora Dieback Distribution

The Project Area contained 32.72 ha of interpretable vegetation, with the remaining bushland and industrial zones within the assessment categorised as Excluded or Permanently Uninterpretable. No historic or new infestations were detected within the Project Area. Remnant vegetation was located primarily along Investigator Drive and east of Abercrombie Road. Indicator species found within the Uninfested areas included:

- *Adenanthos cygnorum,*
- *Banksia attenuata,*
- *Banksia grandis,*
- *Banksia menziesii,*
- *Banksia sessilis,*
- *Banksia species,*
- *Macrozamia riedlei, and*
- *Xanthorrhoea preissii.*

The Phytophthora Dieback Occurrence categories mapped during the assessment are displayed in **Error! Reference source not found.**.

4.3 Permanently Uninterpretable Areas

Eight individual areas equating to 16.05 ha of the Project Area were classified as Permanently Uninterpretable due to the lack of sufficient indicator species. These areas were dominated by dense shrubland often found in water gaining sites or along heavily disturbed remanent bushland and rehabilitated bush.

4.4 Unknown Areas

Approximately fourteen areas equating to 74.51 ha of the Project Area were classified as Unknown. This category was used for areas where access was not granted during the course of the assessment.

4.5 Excluded Areas

101.55 ha of the Project Area was classified as Excluded due to the complete lack of indicators and in some cases natural vegetation. Areas such as these include safety bays, powerline corridors, major roads such as Anketell Road and Kwinana Freeway, industrial areas and completely cleared vegetation often found on residential properties and farmland. While the majority of Excluded areas corresponded with a Keighery Vegetation Condition Scale Rating of 5 (Degraded) or 6 (Completely Degraded), the vegetation south of Anketell Road between the Perth Motorplex access road in the west and Abercrombie Road in the east was assigned the Scale Rating of 4 (Good). Due to a lack of indicator species resulting from the natural vegetation type and observed disturbance, this area was incorporated into the Excluded category.

4.6 Allocation of Categories

The Phytophthora Dieback Occurrence categorised mapped during the assessment are tabulated in Table 5.

Table 5 – Results Summary of the Project Area.

Category	Protectable Area (ha)	% of total area
Uninfested	32.72	14.55
Permanently Uninterpretable	16.05	7.14
Excluded	101.55	45.17
Unknown	74.51	33.14
TOTAL AREA	**224.83**	

4.7 Sample Summary

Five soil and tissue samples were taken during the course of the assessment (Table 6).

Table 6 – Soil and Tissue Sample Results.

Sample Number	Plant Sampled	Easting	Northing	Result
SH01	*Banksia attenuata*	386073	6435881	Negative
SH02	*Xanthorrhoea preissii*	385400	6435903	Negative
SH03	*Xanthorrhoea preissii*	385777	6435924	Negative
SH04	*Banksia attenuata*	386270	6435918	Negative
SH05	*Xanthorrhoea preissii*	386431	6435932	Negative

5 Discussion

Glevan Consulting was commissioned by Westport Roads IPT to conduct a Phytophthora Dieback assessment of the Anketell Road Project Area. The assessment took place between 03/06/2025 to the 06/06/2025, with no infestations of Phytophthora Dieback observed within the Project Area.

32.72 ha of remnant bushland was classified as Uninfested with sufficient indicator species present. Indicators included *Banksia attenuata, Banksia menziesii, Banksia grandis, Banksia sessilis, Banksia species, Adenanthos cygnorum, Xanthorrhoea preissii,* and *Macrozamia riedlei.*

Scattered isolated deaths were observed throughout the Project Area and were deemed to be background deaths. This was determined via evident mechanical disturbance, electrical and gas line corridors and low-lying water gaining sites where water logging is highly likely. Various species of weeds creeping into the bush land from the main roads may also contribute to lower interpretability in areas as this reduces and out competes populations of small groundcover susceptible species.

16.05 ha of remnant bushland was classified as Permanently Uninterpretable due the lack of sufficient indicators. These include low-lying water gaining areas and rehabilitated bush on roadsides where non-susceptible shrubs and bushes were observed. Scattered Indicator deaths could be observed throughout the low-lying areas; these deaths were attributed to potential water logging and were deemed background deaths unrelated to Phytophthora Dieback as the did not possess the characteristics of Phytophthora Dieback disease.

74.51 ha was classified as Unknown due to access to the specified areas not being granted during the course of the assessment. Safety bays, powerline corridors, major roads, industrial areas and cleared vegetation make up 101.55 ha of the Excluded classification within the Project Area.

Five soil and tissue samples were taken over the course of the assessment, all five being concentrated within the bushland south of Investigator Drive. All samples have since returned negative results.

Phytophthora Dieback occurrence categories assigned as part of this assessment are valid for a period of 12 months from the date of survey.

6 Bibliography

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7 Appendices

7.1 Phytophthora Dieback Occurrence Map

The provided map is the Phytophthora Dieback occurrence map.

The assessment area is displayed as a blue boundary line. The following categories are also shown (if present in the assessment area):

- Excluded (shown as yellow). Areas of high disturbance where natural vegetation has been cleared and is unlikely to recover to a level that is interpretable.
- Infested (shown as red). Determined from the assessment to have the plant disease caused by *Phytophthora cinnamomi*. Phytophthora Dieback caused by other *Phytophthora* species will be displayed as other colours, typically shades of orange and yellow.
- Uninfested (shown as green). Determined from the assessment to be free of plant disease Phytophthora Dieback.
- Permanently Uninterpretable (shown as purple). Undisturbed areas where susceptible plants are absent, or too few to decide the presence or absence of Phytophthora Dieback.
- Temporarily Uninterpretable (shown as grey). Areas of disturbance where natural vegetation is likely to recover.

Additional spatial data that may be shown include:

- Sample location.

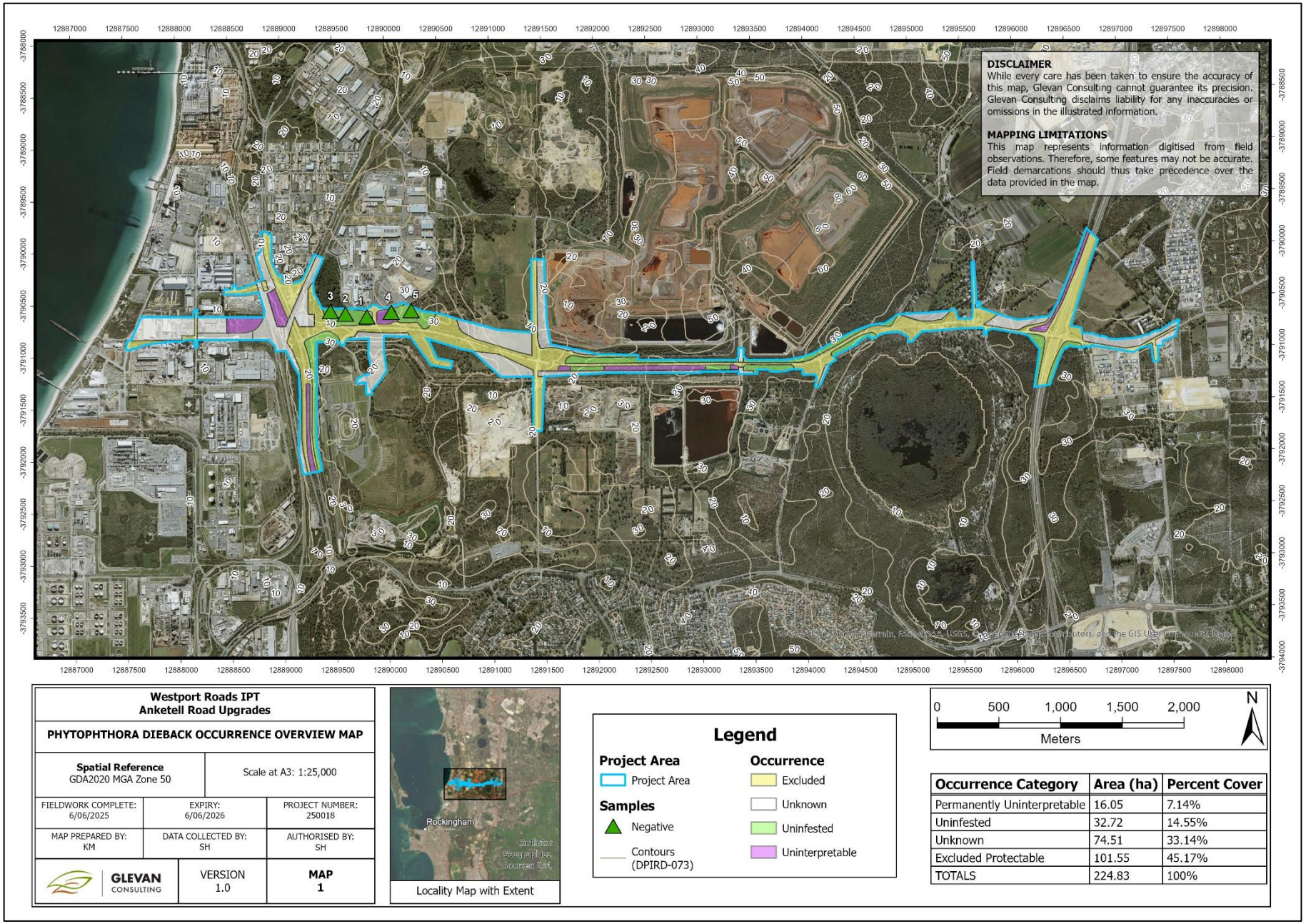
7.2 Mapping Metadata

Dataset Description	
Title	Anketell_Road_Upgrades_2025
Data Created	02/07/2025
Date Last Updated	02/07/2025
Abstract	Phytophthora dieback occurrence and shapefiles for the Anketell Road assessment.
Purpose	Phytophthora Dieback category boundary mapping.
Document Number	GC-25-0018
Contact Organisation	Glevan Consulting
Contact Name	Shannon Hewitt
Contact Position	Registered Dieback Interpreter
Contact Phone	0487 253 158

Contact Email	shannon.hewitt@glevan.com.au
Lineage	All field data recorded using ESRI Field Maps on a GPS enabled device.
Datum / Coordinate System	GDA2020 MGA Zone 50
Geographic Description	Anketell Road, Western Australia
Restrictions	None

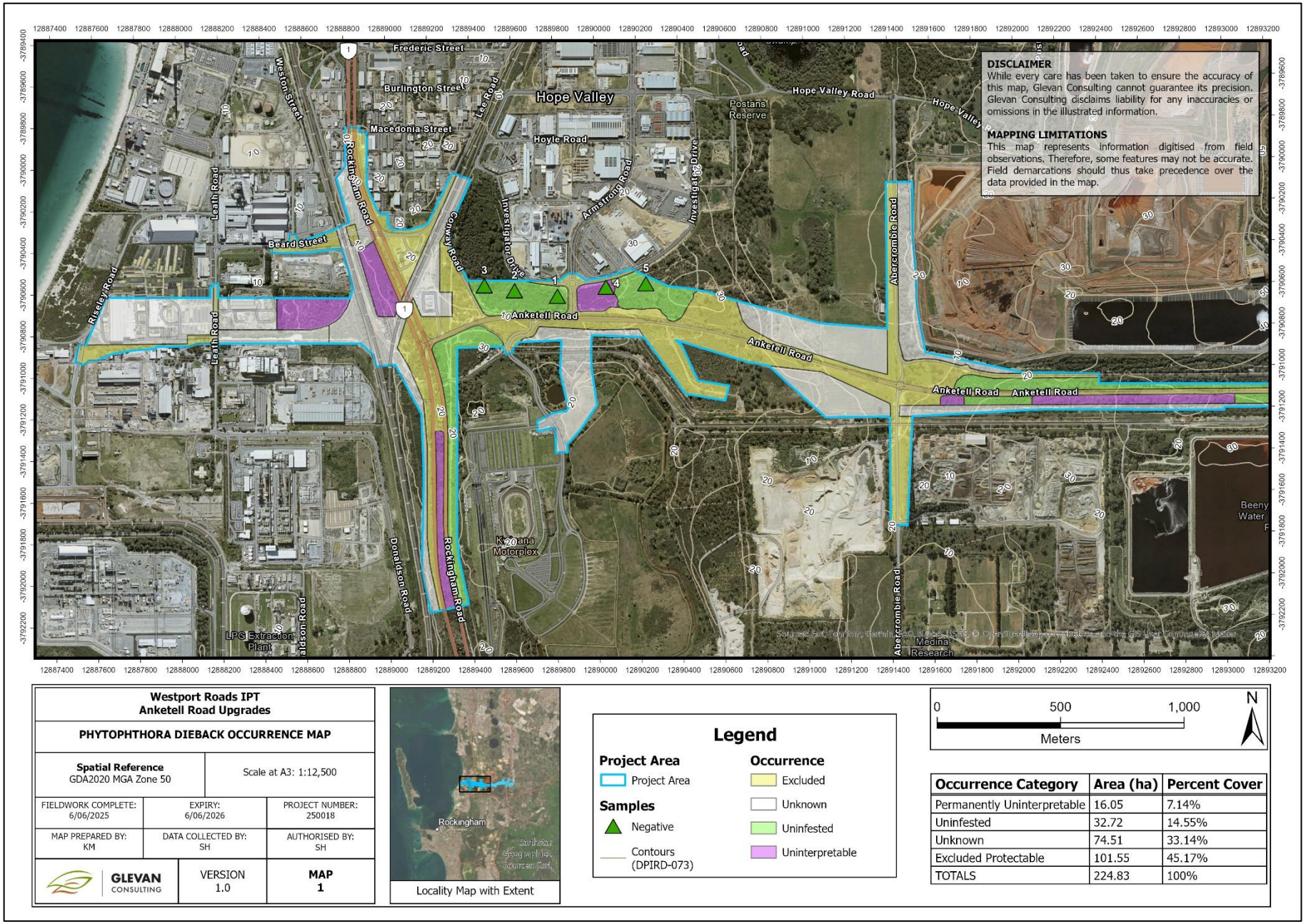
7.3 Shapefile Spatial Data

Shapefile Spatial Data	
File Contents	**File Name**
Occurrence	Anketell_Road_Upgrades_2025_Occurrence
Samples	Anketell_Road_Upgrades_2025_Samples
Project Area	Anketell_Road_Upgrades_2025_Project_Area



Occurrence Category	Area (ha)	Percent Cover
Permanently Uninterpretable	16.05	7.14%
Uninfested	32.72	14.55%
Unknown	74.51	33.14%
Excluded Protectable	101.55	45.17%
TOTALS	224.83	100%

Figure 2 – Phytophthora Dieback Occurrence Overview Map.



Occurrence Category	Area (ha)	Percent Cover
Permanently Uninterpretable	16.05	7.14%
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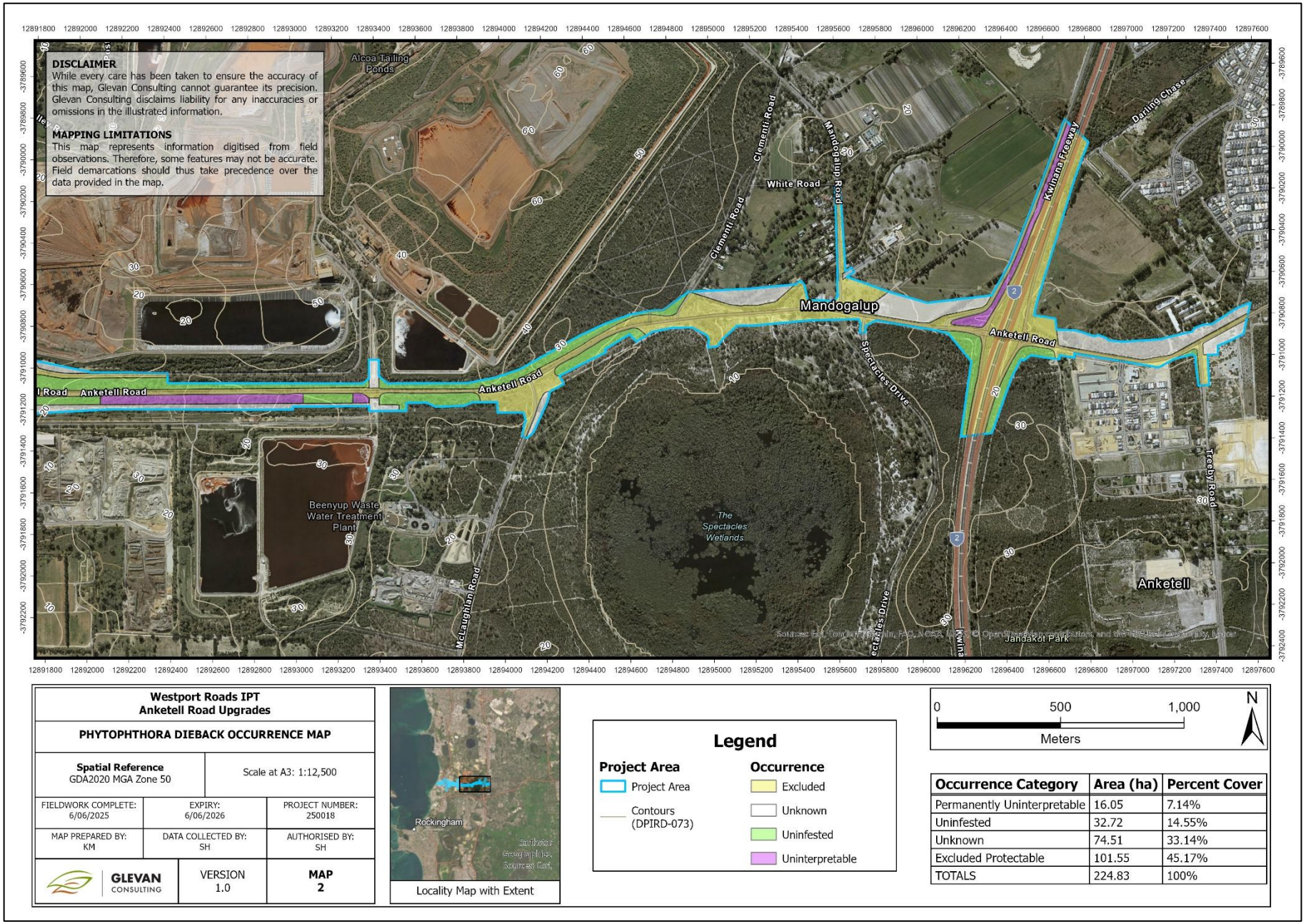
Unknown	74.51	33.14%
Excluded Protectable	101.55	45.17%
TOTALS	224.83	100%

Figure 3 – Phytophthora Dieback Occurrence Map 1.



Occurrence Category	Area (ha)	Percent Cover
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Unknown	74.51	33.14%
Excluded Protectable	101.55	45.17%
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Figure 4 – Phytophthora Dieback Occurrence Map 2.

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