

**P940C – Alkimos SDP Enabling Earthworks
Weed and Dieback Survey and Dieback Management Plan
Water Corporation
P940C-0-3
November 2023**

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1 EXECUTIVE SUMMARY

Water Corporation (WC) is proposing to construct and operate a new seawater desalination plant (SDP) and Groundwater Treatment Plant (GWTP) plant adjacent to the existing Alkimos Wastewater Treatment Plant (WWTP), within the Alkimos Water Precinct (Lot 1050 Marmion Avenue, owned by WC), and a new 33 km pipeline connecting the SDP to the Wanneroo Reservoir. Collectively, these elements form the Alkimos Seawater Desalination Plant project (Alkimos SDP).

Alkimos is approximately 40 km northwest of the Perth central business district. The Project has a terrestrial development envelope of 130.10 ha, of which 69.66 ha comprises native vegetation. The SDP development envelope is 31.75 ha and the pipeline is 98.35 ha.

This report focusses on the areas that will be disturbed during the SDP enabling earthworks, when vegetation and topsoil will be stripped and stockpiled. Excess cut will be hauled a short distance to an adjacent DevelopmentWA site to the southwest. It is proposed to mulch suitable stripped vegetation.

To meet the environmental approval conditions for the project, Water Corporation must undertake a baseline weed survey and dieback survey of the proposed clearing area and 25 m into adjacent conservation areas, and develop a Dieback Management Plan to the satisfaction of the Department of Biodiversity, Conservation and Attractions (DBCA). Additionally this plan seeks to identify the sections where topsoil is suitable for use in revegetation, and where alternative uses should be considered due to the presence of dieback or problematic weeds.

The weed survey was conducted by Peter Grose of Tranen Revegetation Systems who had previously done extensive work on the site for WC, including weed control. The dieback survey was conducted by Bruno Rikli from Bark Environmental, a DBCA Registered Dieback Interpreter with extensive experience in the field.

The same common weed species are distributed across the site in varying densities depending on the condition of remnant vegetation. Weed cover is generally low in areas of high density remnant vegetation, and prolific in the disturbed areas that are devoid of natives. The most abundant weed species were primarily *Pelargonium capitatum* (Rose pelargonium), *Trachyandra divaricata* (Dune Onion Weed), *Euphorbia terracina* (Geraldton Carnation Weed) and various annual and perennial tussock grass weeds. All are endemic to the area and are considered manageable.

The weed survey found one small individual of a weed species (apple of Sodom – *Solanum linnaeanum*) declared under the *Biosecurity and Agriculture Management (BAM) Act 2007* in the City of Wanneroo. Although in this locality it is exempt from control measures, it was removed. Small numbers of two other species: narrowleaf cottonbush (*Gomphocarpus fruticosus*), and doublegee (*Rumex hypogaeus*), declared in other jurisdictions, but not in this region, were also removed. No Weeds of National Significance were recorded.

Topsoil in areas of high weed concentrations (i.e. >5% cover class) is considered unsuitable for re-use in rehabilitation and offsets as this material is likely to transfer these weeds to new locations. Removal of surface weeds may remove living plants, but will not treat the seeds stored in the soil over multiple years. Weed infested topsoil should be discarded in other weed infested areas, or buried, where it will not have any material impact. Only topsoil with a high proportion of remnant native vegetation should be re-used in rehabilitation as this will spread the seed of the native species and minimise the spread of weeds.

The Phytophthora dieback survey classed 90% of the area as uninterpretable, containing few or no dieback indicator plants, and 10% as excluded, being either in completely degraded vegetation condition or in areas cleared for roads and infrastructure. No dieback evidence was detected, and no other widespread pathogens, plant diseases or plant pests of significance were observed that would warrant specific management measures. Overall where intact native vegetation is present it was in good or better condition at the time of assessment. Therefore, areas mapped as uninfested are considered protectable from dieback introduction. As a precautionary measure basic dieback hygiene management protocols would be appropriate for disturbance works. A dieback management plan was prepared for implementation during the earthworks, and provided it is adhered to dieback is of no risk to the project.

2 INTRODUCTION

2.1 Project Description

Water Corporation (WC) is proposing to construct and operate a new seawater desalination plant (SDP) and Groundwater Treatment Plant (GWTP) plant at the Alkimos Water Precinct, and an associated new 33 km integration pipeline connecting the SDP to the Wanneroo Reservoir ('the Proposal'). Collectively, these elements form the Alkimos Seawater Desalination Plant project (Alkimos SDP). The SDP and GWTP are to be located adjacent to the existing Alkimos Wastewater Treatment Plant (WWTP), within the Alkimos Water Precinct (Lot 1050 Marmion Avenue, owned by WC).

Alkimos is located approximately 40 km northwest of the Perth central business district in the northwest corridor, north of Quinns Rock beach and south of Yanchep beach. The Project has a terrestrial development envelope of 130.10 ha, of which 69.66 ha is native vegetation. The SDP DE represents 31.75 ha and the pipeline DE covers an area of 98.35 ha.

This report focusses on the areas that will be disturbed during the SDP enabling earthworks, when vegetation and topsoil will be stripped and stockpiled. Excess cut will be hauled a short distance to the adjacent DevelopmentWA site to the southwest. It is proposed to mulch suitable stripped vegetation.

2.2 Objectives

To meet the environmental approval conditions for the project, Water Corporation must undertake a baseline weed survey and dieback survey of the proposed clearing area and 25 m into adjacent conservation areas, and develop a Dieback Management Plan to the satisfaction of the Department of Biodiversity, Conservation and Attractions (DBCA). Additionally this plan seeks to identify the sections where topsoil is suitable for use in revegetation, and where alternative uses should be considered due to the presence of dieback or problematic weeds.

2.3 Experience of Those Conducting the Surveys

2.3.1 Peter Grose of Tranen

Peter (founder of Tranen in 1992 and Managing Director, PhD Restoration Ecology, UWA, 2014, Green Card for working in potentially dieback-infested areas) has done extensive revegetation work in the Alkimos area, including:

- ongoing weed control on the adjacent Alkimos Beach project since 2015 and nearby Alkimos Vista project since 2019;
- walking this project site in 2018 and providing free advice for revegetation of the SDP site to WC – for this WC provided a spring 2016 Strategen vegetation and weed survey of the area and preliminary SDP drawings;
- collecting native seed from this site and the surrounding areas in 2021/22 for WC and 2022/23 for Development WA;
- preparing a revegetation plan for Jacobs/WC for this and offset areas in 2021/22; and
- conducting an extensive search and control of the whole site for doublegee, narrowleaf cottonbush, and common prickly pear weeds on parts of the site from 2021 to 2023.

2.3.2 Bruno Rikli of BARK Environmental

Bruno (Director, B.SC Env Mgmt, Cert CLM, DBCA Registered Dieback Interpreter) is a leading scientist specialising in pathogens with 30 years of experience from Regional Science Manager in two international consulting firms and Senior Science roles in State and Local governments in Western Australia. His skills extend from roles including State Government Dieback Interpreter/Forester/Ranger, Agricultural Biosecurity Officer, National Park Ranger, TAFE Lecturer and during this time he has maintained Registration as a DBCA Dieback Interpreter. He is a leader in Phytophthora Management in Australia and has collaborated with all tiers of the Australian government, industry and the community to mitigate plant disease threats and impacts.

3 SURVEY AREA

The survey area for both the weed and dieback surveys are shown in purple in Figure 1 below.



Figure 1 Survey Area

4 WEED SURVEY

4.1 Desktop Assessment

Figure 2 shows the survey area superimposed on an extract of the Strategen 2016 spring survey vegetation map, with surrounding areas erased for clarity. Most of the survey areas comprises coastal heath (yellow) with some sections of tuart open woodland (orange) and mixed shrubland (pink). Grey shaded area are degraded, and green planted.

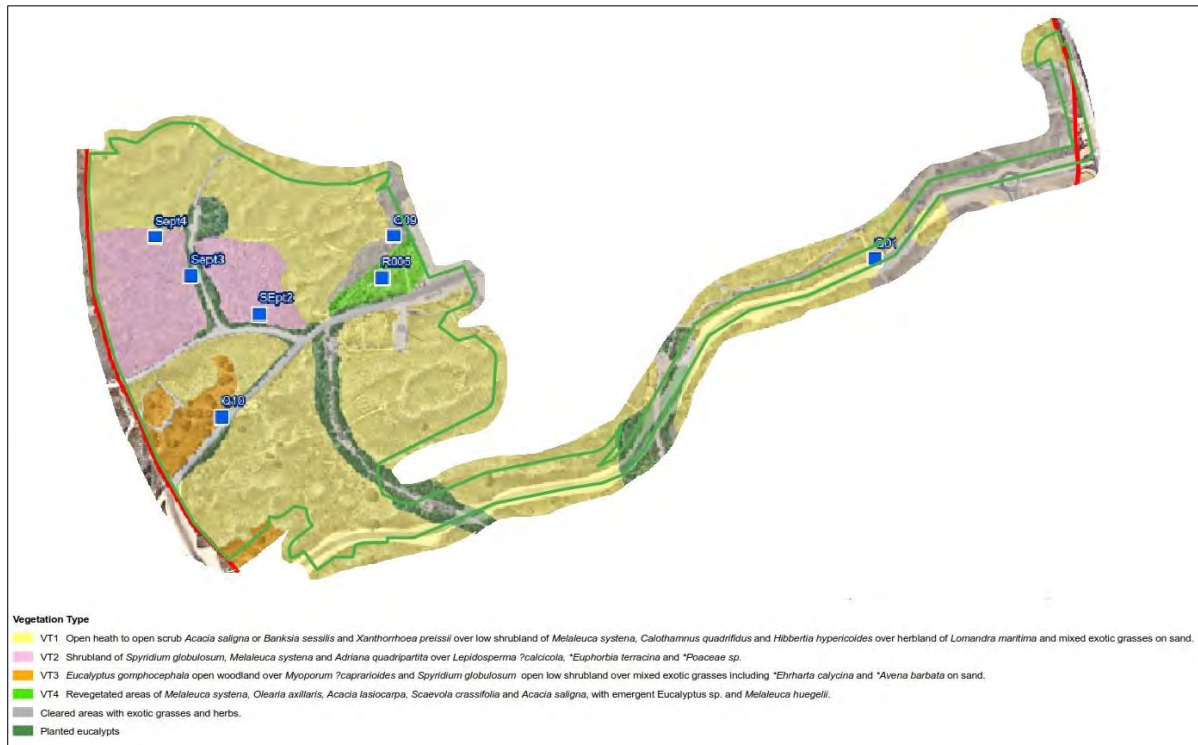


Figure 2 Survey Area Superimposed on the Strategen 2016 Spring Survey Vegetation Map

Two weeds declared under the BAM Act have previously been recorded and actively managed in the area: doublegee (*Rumex hypogaeus*), and narrowleaf cottonbush (*Gomphocarpus fruticosus*). These species however are not declared within the City of Wanneroo area in which this site falls and therefore have no active management requirements. They are however problematic environmental weed species to consider in planning.

Tranen previously surveyed the area in 2021 for doublegee (*Rumex hypogaeus*) with Figure 3 below showing the assessment area and locations where individuals were found. This species is relatively new to the area and was concentrated along the tracks having been brought in and moved around the site by the spiky seed sticking to vehicle tyres, shoes and kangaroo hooves.

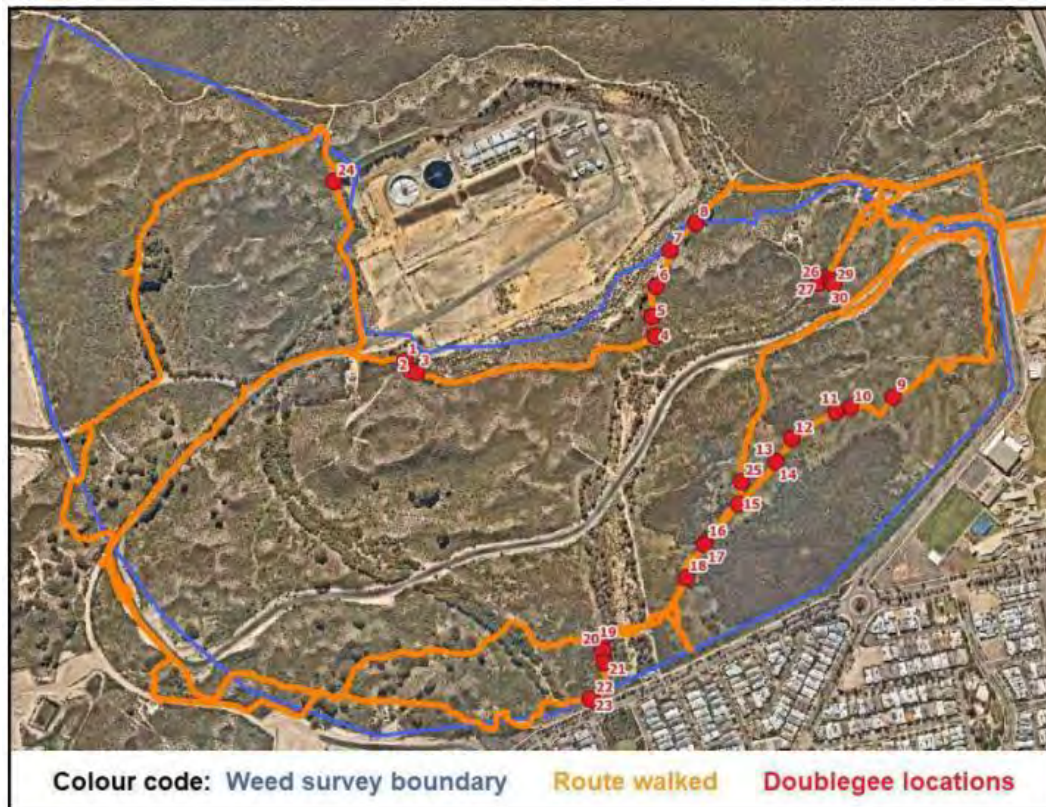


Figure 3 Doublegee Distribution In 2021 Survey

Initial 2021 narrowleaf cottonbush investigations and control were focussed around the area east of doublegee location 9. Later during seed collections additional specimens were found in other parts of the site, mostly hidden by native vegetation, and removed. Seeds of this species are very light and are spread over long distances by wind after the seed pods dry out in summer as the released seeds are “feathery”, as shown in Figure 4.



Figure 4 Narrowleaf Cottonbush Seeds

The weed species reported by Stratetgen in their spring 2016 survey are shown in Table 1 below.

Table 1 Weed Species Reported by Strategen in Spring 2016

<i>Aira caryophyllaea</i>	<i>Euphorbia terracina</i>	<i>Petrorhagia dubia</i>
<i>Avena barbata</i>	<i>Gladiolus caryophyllaceus</i>	<i>Poaceae sp.</i>
<i>Brassica tournefortii</i>	<i>Heliophila pusilla</i>	<i>Romulea rosea</i>
<i>Briza maxima</i>	<i>Hordeum leporinum</i>	<i>Solanum nigrum.</i>
<i>Briza minor</i>	<i>Hypochaeris glabra</i>	<i>Sonchus asper</i>
<i>Bromus diandrus</i>	<i>Hypochaeris sp.</i>	<i>Sonchus oleraceus</i>
<i>Crassula glomerata</i>	<i>Lagurus ovatus</i>	<i>Trachyandra divaricata</i>
<i>Disa bracteata</i>	<i>Lupinus cosentinii</i>	<i>Trifolium campestre</i>
<i>Ehrharta calycina</i>	<i>Lysimachia arvensis</i>	<i>Ursinia anthemoides</i>
<i>Erodium sp.</i>	<i>Medicago sp. polymorpha</i>	
<i>Eucalyptus sp. (planted)</i>	<i>Pelargonium capitatum</i>	

According to Strategen “None of these species is a Declared Plant species in Western Australia pursuant to section 22 of the Biosecurity and Agriculture Management Act 2007 (BAM Act) according to the Western Australian Department of Agriculture and Food (DAFWA 2017). Grassy weed species such as *Ehrharta calycina* (Perennial Veldt Grass), *Avena barbata* (Wild Oats) and *Lagurus ovatus* (Hare’s Tail Grass) were recorded frequently throughout the survey area and, in some instances, with high percentage foliage cover. Non-grassy weeds including *Euphorbia terracina* (Geraldton Carnation Weed) were also recorded frequently in a number of quadrats.”

4.2 Field Survey Method and Results

The site was walked from east to west between 17 and 24 October 2023, with the most prevalent weed species from a management perspective noted. Individual species were not mapped separately, except for noteworthy species. Instead weed cover was mapped in the ranges 0-5%, 5-25% and 25-50% roughly in line with the Braun-Blanquet (1965) cover class scale, with most species distributed across each zone. Georeferenced photographs were also taken at regular intervals and at points of particular interest (see Appendix 2).

Weeds in the SDP generally fall within two categories: widely distributed species that have been well established in the area for decades, and new opportunists that have been brought into the site via the network of unauthorised vehicle tracks that criss-cross the area. Good quality native vegetation has limited the spread of the latter species with only the most aggressive weeds moving into the bushland.

Weed species observed are detailed in Table 2, along with overall site relative abundances plus ecological impacts and invasiveness based on the rankings by DBCA for the Swan Region (DPaW 2013).

The minor numbers of small narrowleaf cottonbush, none of which were seed-bearing, were all manually removed, as is recommended by Florabase. The few doublegee, which were outside the area of Tranen’s previous control contract, were also all manually removed, the sand beneath them carefully screened to remove all detached seeds, and all collected material disposed of off-site. Branches of the single small Apple of Sodom were cut off, the stump painted with herbicide, and its seeds disposed of off-site.

Table 2 Details of Weed Species Observed by Tranen in October 2023

Species found by Tranen	Relative abundance within Survey Area	Ecological Impact	Invasiveness
<i>Aira caryophyllea</i>	Rare	Unknown	Unknown
<i>Avena barbata</i>	Moderate	High	Rapid
<i>Brassica tournefortii</i>	Rare	High	Rapid
<i>Briza maxima</i>	Rare	Unknown	Rapid
<i>Briza minor</i>	Rare	Unknown	Rapid
<i>Bromus diandrus</i>	Rare	High	Rapid
<i>Crassula glomerata</i>	Rare	Unknown	Rapid
<i>Ehrharta calycina</i>	Moderate	High	Rapid
<i>Erigeron spp</i>	Rare	Low	Moderate
<i>Erodium botrys</i>	Rare	Unknown	Moderate
<i>Euphorbia paralias</i>	Rare	Unknown	Moderate
<i>Euphorbia terracina</i>	High	High	Rapid
<i>Gomphocarpus fruticosus</i>	Rare	High	Rapid
<i>Heliophila pusilla</i>	Rare	Unknown	Moderate
<i>Hordeum leporinum</i>	Moderate	High	Unknown
<i>Hypochaeris glabra</i>	Rare	High	Rapid
<i>Lagurus ovatus</i>	Common	High	Rapid
<i>Lupinus cosentinii</i>	Rare	High	Moderate
<i>Lysimachia arvensis var arvensis</i>	Moderate	Unknown	Rapid
<i>Medicago polymorpha</i>	Moderate	Unknown	Rapid
<i>Oenothera drummondii</i>	Moderate	Unknown	Rapid
<i>Orobanche minor</i>	Rare	Unknown	Rapid
<i>Pelargonium capitatum</i>	Common	High	Rapid
<i>Petrorhagia dubia</i>	Rare	Medium	Rapid
<i>Raphanus raphanistrum</i>	Rare	Unknown	Moderate
<i>Rumex hypogaeus</i>	Rare	Low	Rapid
<i>Sixalix atropurpurea</i>	Rare	Unknown	Rapid
<i>Solanum linnaeanum</i>	Rare	High	Rapid
<i>Solanum nigrum.</i>	Rare	Medium	Rapid
<i>Sonchus asper</i>	Moderate	Unknown	Rapid
<i>Sonchus oleraceus</i>	Moderate	Unknown	Rapid
<i>Trachyandra divaricata</i>	Common	Medium	Rapid
<i>Trifolium campestre</i>	Moderate	Unknown	Unknown
<i>Ursinia anthemoides</i>	Moderate	Unknown	Rapid
Note: None of these species are on priority alert for the Swan region			

An overall site map with general weed cover classes and noteworthy species are shown in Appendix 1. A summary of the areas covered by each category are presented in Table 3 below.

Table 3 Cover Classes and Area Covered

Cover Class	0 – 5%	5 – 25%	25 – 50%	Total
Area (ha)	25.8	11.8	1.0	38.6
Percentage of total	67%	30%	3%	100%

A location map of photo points and the corresponding images can be found in Appendix 2.

4.3 Discussion

The main results are generally consistent with those reported by Strategen in their 2016 spring survey, and none of those species were of particular concern. Of the other weed species found that were not reported by Strategen, none are of particular concern and are detailed below:

- *Erigeron* is a hardy genus that flourishes in dry conditions. Few large specimens were found, but it can be expected to become more pronounced in summer.
- Only one small patch of *Euphorbia paralias* was noticed, on a road verge. This species has normally only been found in soft sand closer to the coast.
- *Oenothera drummondii* has flourished disturbed sections across the region in the dry conditions due to its extensive root system.
- Most of the *Raphanus raphanistrum* found were small and browning off. There has been little recent growth, most likely attributable to below-average rainfall in recent months.
- Only minor numbers of *Sisalix atrapurpurea* were found, on road verges.

By far the most prolific weed species on the site, apart from grass weeds, is *Pelargonium capitatum*, ranging in size from tiny fresh germinants to large bushes. This was observed in various densities over the whole site, particularly in disturbed areas, but much less prevalent in the areas with high native plant densities. This species is endemic to the region, especially in parkland cleared farmland areas from which it spreads.

The next most prolific is *Trachyandra divaricata*, which is also endemic to the region as above. *Euphorbia terracina* is next and is also endemic to the region. Both species spread easily in coastal areas as the *Trachyandra* is wind dispersed, and the *Euphorbia* explosively dehisces. Both are difficult to control as they co-exist with native vegetation.

No *Gladiolus caryophyllaceus* as reported by Strategen in 2016 were observed. This was surprising, as this species has flourished elsewhere in the region this year, with its pink flowers very noticeable.

In terms of suitability for topsoil reuse, around two-thirds of the site has a weed cover of less than 5%. These areas are considered acceptable for topsoil harvesting for reuse in onsite rehabilitation programs and potentially for offsite offsets as weed burden is expected to be low. In areas with weed cover over 5% the benefits will likely be outweighed by the weed seed bank, and therefore it is not recommended for use in the rehabilitation program.

4.4 Recommendations

1. As planned, vegetation should be stripped, shredded and stockpiled for later use as mulch. The preference would be to limit this to the areas in the 0-5% cover class. However, if the mulch is stockpiled and composted for at least six months this should kill any weed seed that is inadvertently harvested during this process.
2. Topsoil in areas of high weed concentrations (i.e. >5% cover class) is considered unsuitable for re-use in rehabilitation and offsets as this material is likely to transfer these weeds to new locations. Removal of surface weeds may remove living plants, but will not affect the seeds that have accumulated in the soil over multiple years. Weed infested topsoil should be discarded in other weed infested areas, or buried, where it will not have any material impact. Only topsoil from areas with a high proportion of remnant native vegetation should be re-used in rehabilitation as this will spread the seed of the native species and minimise the spread of weeds.

5 DIEBACK SURVEY

5.1 Background

BARK Environmental was commissioned by Tranen to undertake this Phytophthora Dieback Occurrence Assessment. This report details the results from a desktop and field assessment completed in October 2023 and includes a Phytophthora Dieback Occurrence map that will be used to guide Dieback management planning for the proposed disturbance works.

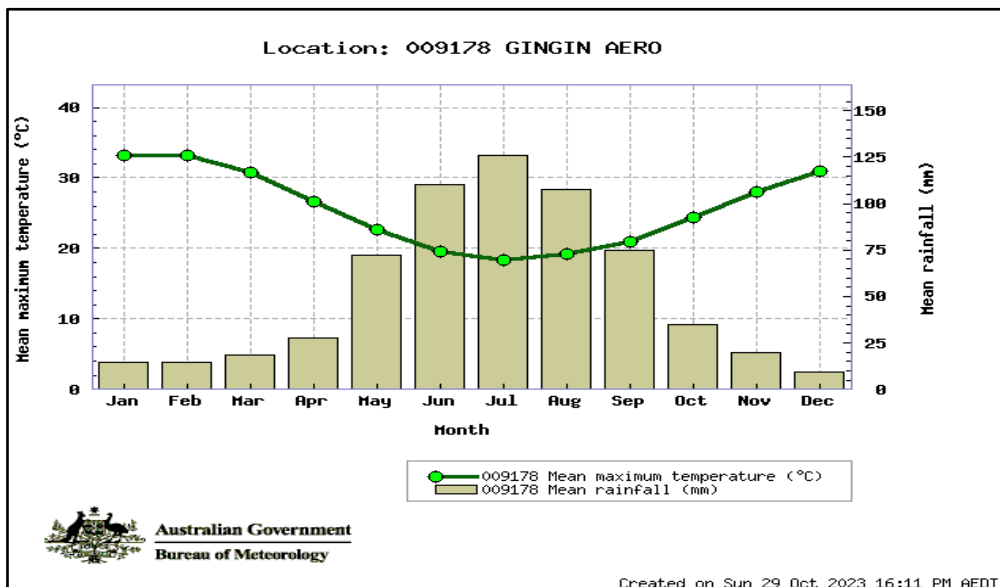
5.2 Site Description and Historical Disturbance

The subject area is located on the Swan Coastal Plain within the well-drained Quindalup Dune System with calcareous soils, steep vegetated dunes in the west and broader dunes in the eastern part of the site (Churchwood & McArthur, 1980).

The local climate is Mediterranean with mild, wet winters and warm to hot, dry summers. The closest Bureau of Meteorology (BoM) weather station is 14.3 km away at the Gingin Aero (Station No. 009178).

The 30-year average climate statistics from Station No. 009178 are given in Figure 5. The mean maximum temperature at this weather station from 1996 to 2023 was 25.7 (°C) and the mean rainfall was 639.4 mm. These statistics indicate the climate as favourable to supporting the pathogen. DPaW (2015) classify this area as falling within the southwest region 'vulnerable zone' where the pathogen can develop in areas of >400 mm isohyet (DPaW, 2015).

Figure 5 Climate Chart – Donnybrook 009534 (BoM, 2023)



Site vegetation types were previously mapped by Strategen Environmental (2017) and those relevant to the subject area are described below in Table 4. There was no evidence of recent fire in the assessment area, but there is evidence of past off road vehicle use, track

rehabilitation and abundant weeds associated with formerly open track vectors. The area now has controlled security access gates and surveillance.

Table 4 Vegetation Types Previously Mapped (Strategen Environmental, 2017)

Vegetation Type description	Comment on Status
<i>Open heath to open scrub Acacia saligna or Banksia sessilis and Xanthorrhoea preissii over low shrubland of Melaleuca systema, Calothamnus quadrifidus and Hibbertia hypericoides over herb land of Lomandra maritima and mixed exotic grasses on sand.</i>	Majority of assessment area.
<i>Shrubland of Spyridium globulosum, Melaleuca systema and Adriana quadripartita over Lepidosperma ?calicicola, *Euphorbia terracina and *Poaceae sp.</i>	North west part.
<i>Eucalyptus gomphocephala open woodland over Myoporum ?caprarioides and Spyridium globulosum open low shrubland over mixed exotic grasses including *Ehrharta calycina and *Avena barbata on sand.</i>	One small area on western boundary.
<i>Revegetated areas of Melaleuca systema, Olearia axillaris, Acacia lasiocarpa, Scaevola crassifolia and Acacia saligna, with emergent Eucalyptus sp. and Melaleuca huegelii.</i>	Excluded from Dieback assessment.
<i>Planted Eucalypts</i>	Planted / treed corridors within dune gullies.

5.3 Methods

5.3.1 Interpretation

Field interpretation was based on the linear and comprehensive methodology described in the manual “*Forest and Ecosystem Management Division 2015, Phytophthora Dieback Interpreter’s manual for lands managed by the department, DPaW, Perth, Western Australia.*” Phytophthora Occurrence categories were determined per Table 5 with consideration of the vegetation condition ratings and assessability (Table 6).

5.3.2 Demarcation

Infested areas are demarcated using 25 mm fluorescent-pink flagging tape tied to trees at chest height with the knots facing into the infestation. Excluded and Uninterpretable areas are demarcated using 25 mm striped black/pink flagging tapes. Taping may not be applied where boundaries are obviously formed by landscape features such as fencing, cleared and degraded areas.

5.3.3 Soil and Tissue Sampling

Any sampling completed is done per DPaW (2015) methodology as supporting evidence of disease presence or absence. Note, it cannot be concluded that an entire site or an entire stockpile of basic raw material is dieback-free from a single or a small number of samples where *Phytophthora* was not detected.

5.3.4 Mapping

Field observations, boundaries, waypoints and survey data are recorded on hand-held GPS and downloaded into a Geographic Information System (GIS) to produce the *Phytophthora* Occurrence Map.

5.3.5 Limitations

There were no limitations to this assessment.

5.3.6 Map Validity

Dieback Occurrence Maps are valid for 12 months for planning disturbance activities (expiry Oct 2024). They can be rechecked annually for up to three years (expiry Oct 2026).

After October 2026, a comprehensive assessment method should be applied to ensure accurate mapping of disease information is available for planning disturbance activities.

Table 5 Phytophthora Occurrence Categories

Phytophthora occurrence category	Description
Infested	Determined by a registered interpreter to have plant disease symptoms consistent with the presence of <i>Phytophthora cinnamomi</i> .
Uninfested	Determined by a qualified Interpreter to be free of plant disease symptoms which indicates the presence of <i>Phytophthora cinnamomi</i>
Uninterpretable	Where susceptible plants are absent or too few to enable the interpretation of <i>Phytophthora cinnamomi</i> presence or absence
Temporarily Uninterpretable	Areas of temporary disturbance where natural vegetation is likely to recover
Not Yet Resolved	Areas where <i>Phytophthora cinnamomi</i> occurrence diagnosis cannot be easily made within the required timeframe because of inconsistent evidence
Excluded (not coloured on figures)	Areas of long-term high disturbance where natural vegetation has been cleared and is unlikely to recover.

Table 6 Vegetation Condition and Assessability

Vegetation Condition	Phytophthora occurrence category	Typically present	May be present
Naturally vegetated areas. Keighery disturbance rating of 3 or less. <i>Phytophthora</i> occurrence categorisation is possible. Small un-vegetated areas can exist and may be included in the assessment area considering total environmental context.	Infested	Dead and dying reliable indicator species.	Healthy reliable indicator species. Indicator Species Deaths (ISDs) that have been killed by other agents.
	Uninfested	Healthy reliable indicator species.	ISDs that have been killed by other agents.
	Uninterpretable	Very few reliable indicator species.	Occasional reliable indicators, but too few for <i>Phytophthora</i> Dieback interpretation.
	Not Yet Resolved	Usually, reliable indicator species in an environment not favourable to disease development.	Negative sample results for all <i>Phytophthora</i> species.
Vegetation structure temporarily altered. <i>Phytophthora</i> occurrence assessment is will be possible when vegetation structure recovers. Recovery times will be variable depending on severity and type of disturbance.	Temporarily Uninterpretable	Indicator species masked by disturbance typically from fire, harvesting, temporary flooding, poisoning.	Occasional reliable indicator species, but disturbance prevents accurate placement of <i>Phytophthora</i> occurrence
Vegetation structure severely altered. Keighery rating 5 or greater. Assessment not possible. Can be determined by desktop assessment (aerial photo). Small vegetated areas may exist, may be excluded from assessment area considering total environmental context.	Excluded (not coloured or transparent white layer on aerial imagery figures)	Pasture, pits, drainage basins, easements, infrastructure, large roads (sealed and unsealed) permanent flooding, plantations, parkland tree stands.	Sporadic reliable indicator species

5.4 Results

The results from this 2023 assessment are given below for a total assessment area of 41.02 ha. A dieback occurrence map can be found in Appendix 3. Supporting evidence of site photographs are shown in 0 and photo location points are shown on the Dieback Occurrence Map.

5.4.1 Assessment Category Distribution

Two categories have been applied to the assessment area as described below and listed in Table 7.

- **Uninterpretable** – Approximately 90% of the assessment area. The vegetation types in this mapped category contain too few, or no reliable *Phytophthora* disease indicator plants. Some very small areas of *Xanthorrhoea preissii* were observed and in healthy condition, but all were too small to map in the greater landscape context of the Uninterpretable category.
- **Excluded** – This approximately 10% of the assessment area included Degraded and Completely Degraded vegetation condition areas, a centrally located rehabilitated area on limestone, cleared roads and infrastructure such as the Telstra tower.

Table 7 Areas Statement – October 2023

Occurrence categories	Area (ha)
Infested	0.00
Uninfested	0.00
Uninterpretable	36.90
Temporarily Uninterpretable	0.00
Excluded	4.12
Total	41.02

5.4.2 Disease Expression

Phytophthora Dieback (Dieback) was not detected through observations and walking transects over the entire assessment area. This was due to the extent of the Uninterpretable category. Some natural senescence and insect damage to vegetation was observed, but that was not widespread or significant and does not warrant specific management. Some scattered plant/tree mortalities are present and these were attributed to drought impact with no patterns of death attributed to the *Phytophthora* pathogen.

5.4.3 Disease Impact

No disease impact was observed and where vegetation is present, it is in good to better condition.

5.4.4 Sample Results

It was not possible to sample due to the absence of dead/dying indicator plants from within the assessment area. Therefore, no samples were collected during this assessment.

5.5 Conclusion

There was no observed *Phytophthora* Dieback evidence within the assessment area. The assessment area is largely Uninterpretable due to the existing plant community not containing sufficient numbers of indicator plant species necessary to enable Dieback interpretation. All remaining areas have been allocated the Excluded category, predominantly due to clearing and degradation. No other widespread pathogens, plant diseases or plant pests of significance were observed that would warrant specific management measures. Overall, where intact native vegetation is present, it was in good to better condition at the time of assessment. Therefore, as no disease symptoms were found, it is suggested that areas mapped as Uninfested are considered Protectable from *Phytophthora* Dieback introduction. As a precautionary management measure in this instance, basic Dieback hygiene management protocols would be appropriate for disturbance works within the assessment area.

A Dieback Management Plan was prepared and is contained in Appendix 5.

6 REFERENCES

Alkimos Flora and Vegetation Survey – Spring 2016 Prepared for Water Corporation by Strategen November 2017

Bureau of Meteorology (BoM) (2023). Climate statistics online, accessed 29.10.2023. <http://www.bom.gov.au/jsp/ncc/cdio/cvg/av>

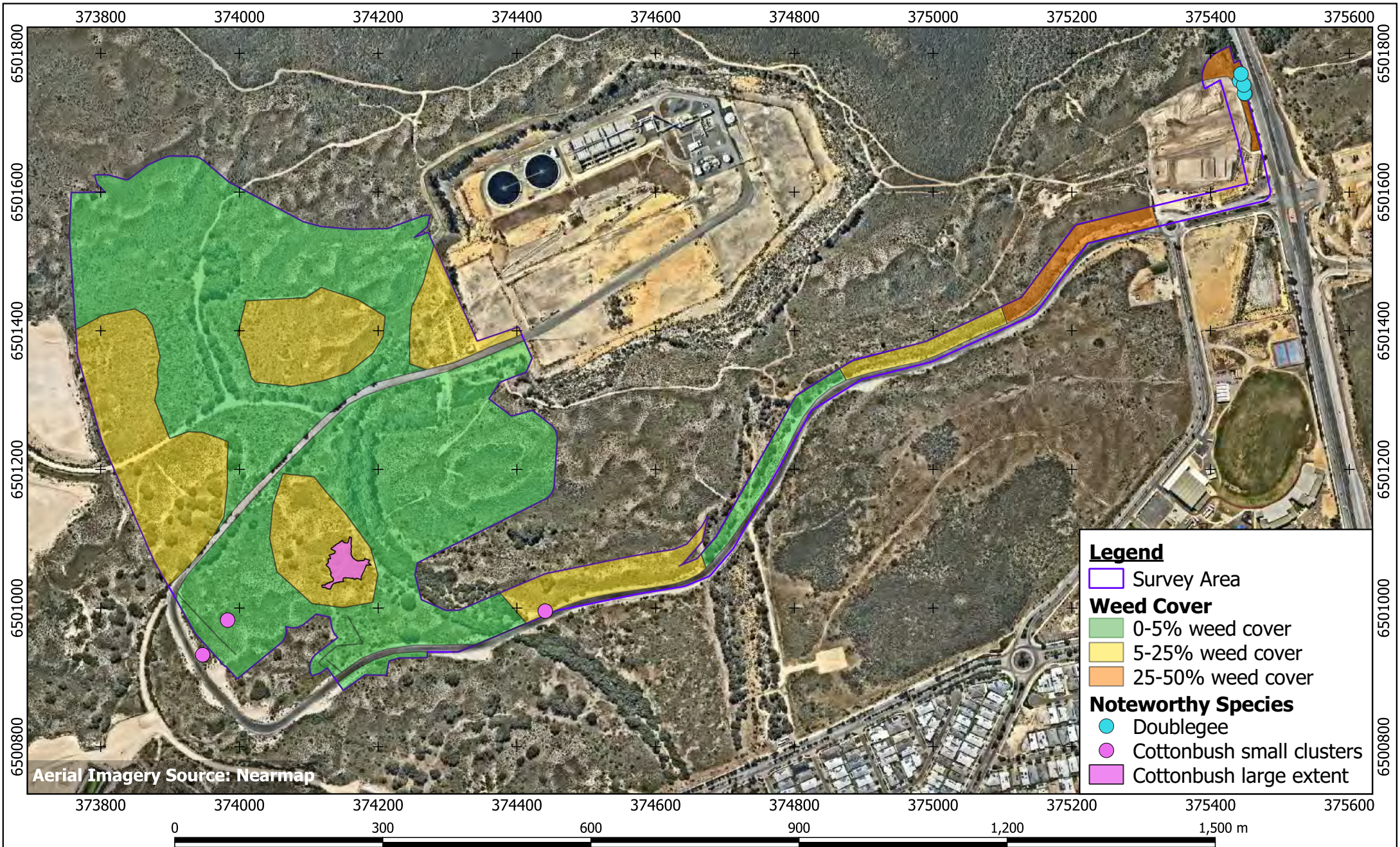
Churchward, HM. & McArthur, WM. 1980. Landforms and Soils of the Darling System, in Atlas of Natural Resources, Darling System, Western Australia, eds Department of Conservation and Environment, Perth.

DPaW (2015) Forest and Ecosystem Management Division 2015. Phytophthora Dieback Interpreter's manual for lands managed by the department, DPaW, Perth, WA.

Keighery, B. J. (1994). Bushland Plant Survey: A guide to plant community survey for the community. Wildflower Society of WA Inc.

Weed Prioritisation Process for DPaW (formerly DEC) – “An integrated approach to Weed Management on DPaW-managed lands in WA”. (As at November 2013) and Ecological Impact and Invasiveness Ratings from the Department of Parks and Wildlife Swan Region Species Prioritisation Process 2016 accessed via <https://www.dbca.wa.gov.au/management/threat-management/weeds>

Appendix 1 Weed Survey Map



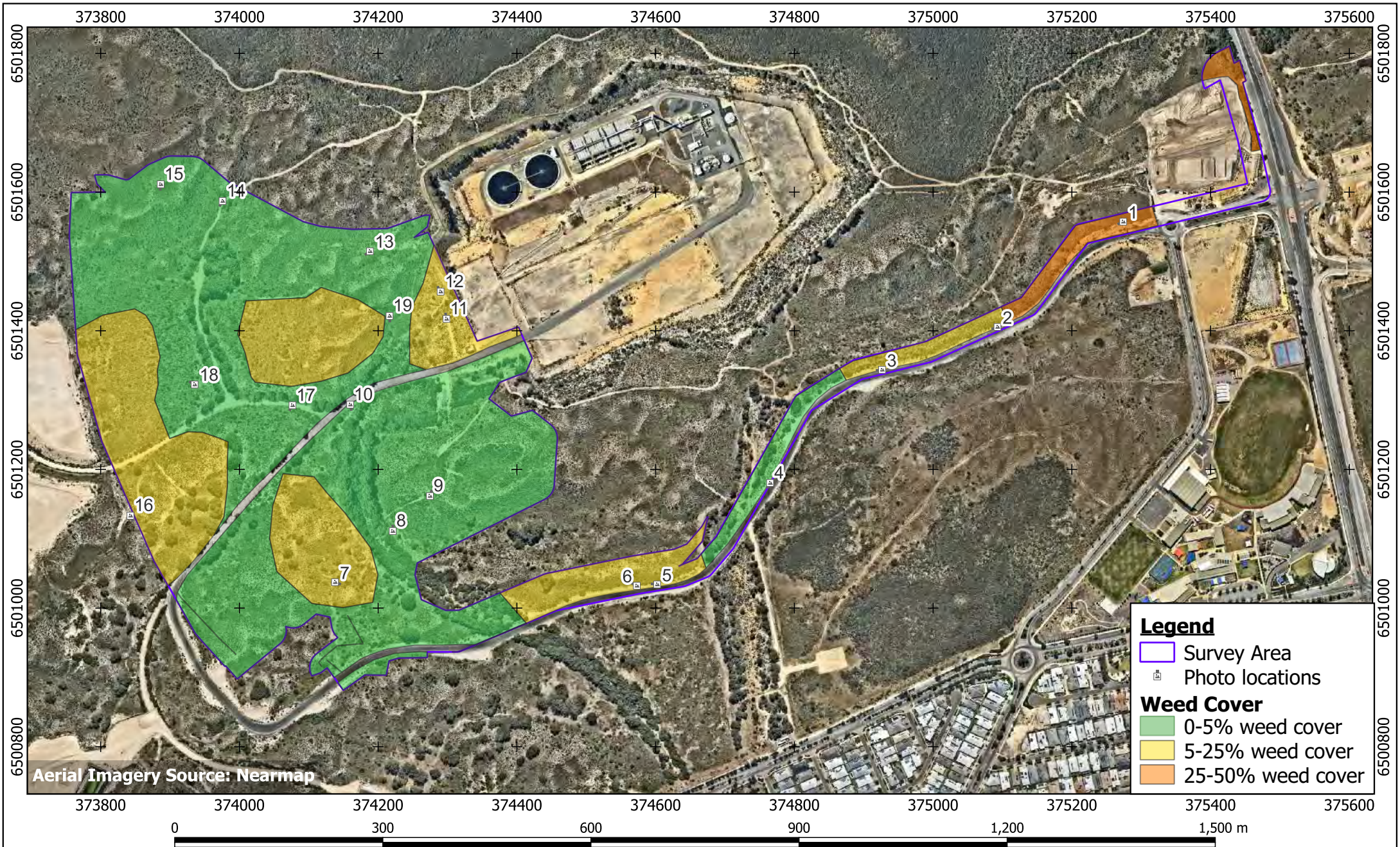
Project: Alkimos Seawater Desalination Plant
 Project Number: P940C
 Client: Water Corporation

Drawing: Weed Survey
 Drawing Number: P940C-01
 Revision: 0

Date: 09/11/23
 Drawn By: PG



Appendix 2 Weed Survey Photographs - Location Map and Images





Pelargonium capitatum and grass weeds (Photo 1)



Pelargonium capitatum, *Trachyandra divaricata* and grass weeds (Photo 2)



Pelargonium capitatum, *Trachyandra divaricata* and grass weeds (Photo 3)



Oenothera drummondii, *Pelargonium capitatum* and grass weeds (Photo 4)



Euphorbia paralias, *Trachyandra divaricata* and grass weeds (Photo 5)



Trachyandra divaricata, *Euphorbia terracina* and grass weeds (Photo 6)



Euphorbia terracina and grass weeds (Photo 7)



Grass weeds (Photo 8)



Few weeds (Photo 9)



Some emerging *Sonchus* spp and *Pelargonium capitatum* on a road verge. This is a small isolated patch and atypical (Photo 10)

The following photographs show weeds on the left side of the WWTP access road



Grass weeds (Photo 11)



Grass weeds, *Trachyandra divaricata* and *Euphorbia terracina* (Photo 12)



Few weeds (Photo 13)



Raphanus raphanistrum (centre), *Trachyandra divaricata*, *Euphorbia terracina* and grass weeds (Photo 14)



Few grass weeds and *Euphorbia terracina* (Photo 15)



Grass weeds, *Trachyandra divaricata* and *Euphorbia terracina* (Photo 16)



Grass weeds, *Trachyandra divaricata* and *Euphorbia terracina* (Photo 17)

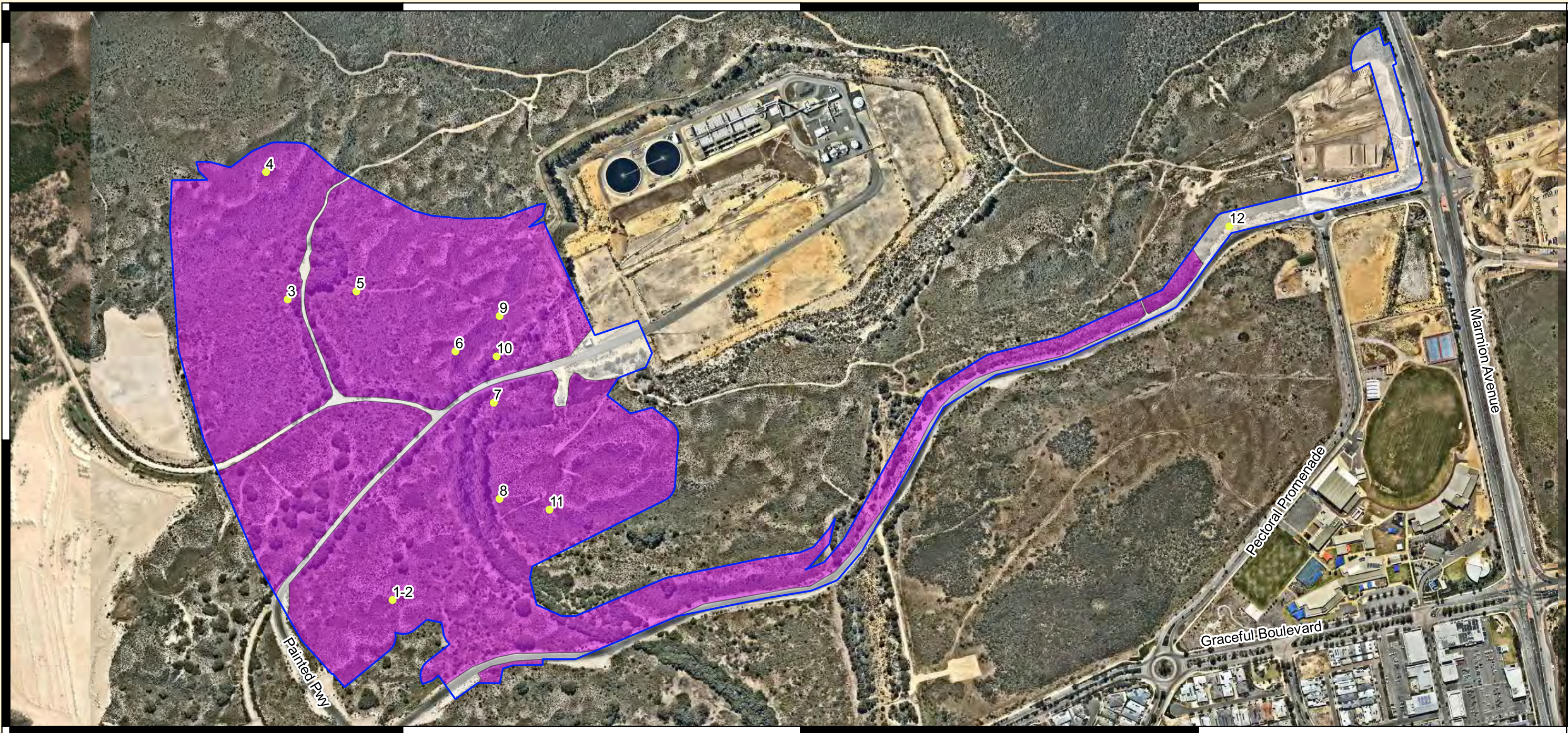


Few grass weeds (Photo 18)



Grass weeds, *Pelargonium capitatum* and *Euphorbia terracina* (Photo 19)

Appendix 3 Dieback Occurrence Map With Photo Point Locations



Legend


- Assessment Area
- Uninterpretable Area
- Excluded Area
- Photo's GPS points

Interpreter: B. Rikli
 Assessment completion: 21/10/2023
 Interpretation Method: Comprehensive & Linear

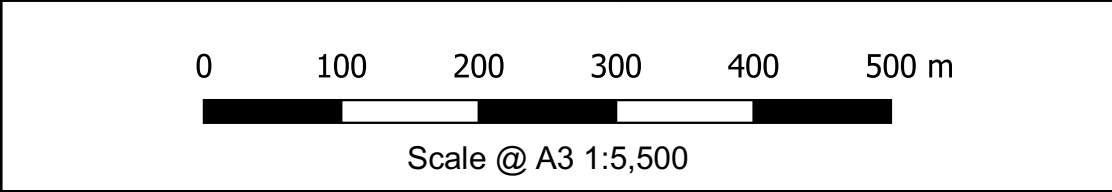
Map Validity:
 Map revalidation due on 21/10/2024. This map should not be used for operational purposes for more than 1 year after assessment completion. Map may be revalidated after a re-check assessment for up to 3 years following initial assessment (This map expires on 21/10/2026).

Map limitations:
 Information shown on this map is positioned relative to mapped features and was captured by hand-held GPS so it may not be entirely accurate. Therefore, field demarcation should be followed.

Area Statement	
Occurrence categories	Area (ha)
Infested	0.00
Uninfested	0.00
Uninterpretable	36.90
Temporarily Uninterpretable	0.00
Excluded	4.12
Total	41.02



Datum: GDA 94
 Projection: MGA Zone 50



**1CW03713 Alkimos SDP
 Earthworks - Dieback Occurrence
 Assessment**

Bark Job:
 BARK_11_2023

Version 1



Appendix 4 Dieback Survey Photographs



Example of uninterpretable vegetation where presence or absence of *Phytophthora* disease cannot be mapped.

374064 / 6501020 (West) (Photo1)



Lack of indicator species to *Phytophthora* sp.

374064 / 6501020 (East) (Photo 2)



Despite some indicator species present e.g., *Xanthorrhoea preissii*, these areas were too small to map as Uninfested separately from the broader surrounding Uninterpretable category.

373919 / 6501436 (Northwest) (Photo 3)



Uninterpretable coastal heath.
373889 / 6501612 (Southeast) (Photo 4)



Example of 'background' deaths of *Acacia saligna*, typically caused by senescence, common cankers and/or drought on coastal dunes
374014 / 6501447 (Northwest) (Photo 5)



Uninterpretable coastal vegetation and former off road vehicle track degradation
374151 / 6501364 (Southeast) (Photo 6)



Uninterpretable coastal vegetation view towards Telstra tower
374204 / 6501293 (Southeast) (Photo 7)



Presence of one indicator species (*X. preissii*) surrounded by unsusceptible coastal
vegetation and this area was mapped as Uninterpretable
374212 / 6501160 (South) (Photo 8)



Example of Excluded Degraded area
374212 / 6501413 (South) (Photo 9)



Rehabilitated area
374208 / 6501357 (East) (Photo 10)



Uninterpretable dune heath vegetation
374281 / 6501145 (East) (Photo 11)

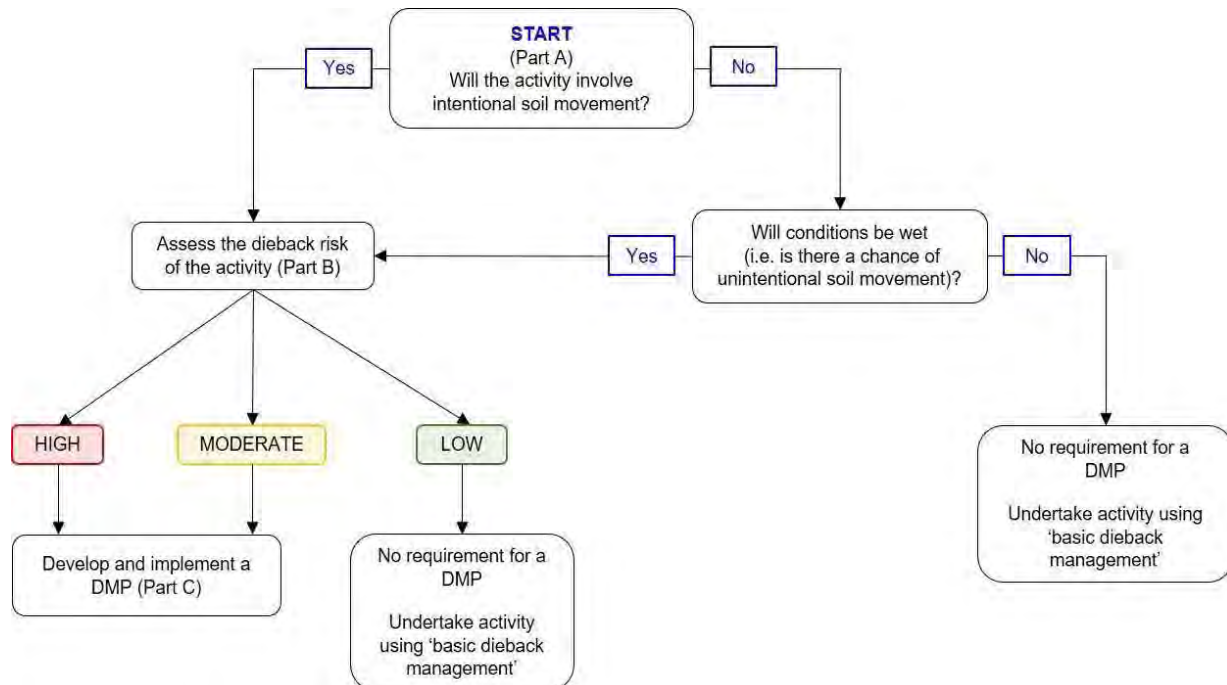


Excluded area at the eastern end of the assessment area, heavily infested with weeds and demarcated with pink/black striped flagging tape where it adjoins Uninterpretable native vegetation to the west
375221 / 6501537 (west) (Photo 12)

Appendix 5 Dieback Management Plan

PART A: DISTURBANCE ACTIVITY

The decision tree below will help determine if the activity constitutes a disturbance and requires a risk assessment (Part B), and the risk assessment will determine if a DMP is required (Part C).



Details of disturbance activity

Region/District of activity:	Swan Region	Date of activity: <i>(give date range if a prolonged activity)</i>	6-12 months commencing late November 2023
Location of site of activity: <i>(Forest Block, Reserve or coordinates)</i>	Lot 1050 Marmion Avenue	Disease Risk Area: <i>(yes or no)</i>	No
Vegetation type/complex:	Quindalup Complex (Hedde et al, 1980)		
Description of the activity: <i>(timber harvesting, road upgrade etc.)</i>	Clearing vegetation, topsoil and earthworks to construct a new seawater desalination plant (SDP) and Groundwater Treatment Plant (GWTP) in the Alkimos Water Precinct; as part of the Alkimos Seawater Desalination Plant project ('Alkimos SDP').		
Proponent of the activity: <i>(DBCA, FPC, MRWA, Water Corp. etc.)</i>	Water Corporation		
Departmental objective for dieback management:	To minimise the potential for the introduction or spread of Phytophthora Dieback associated with planned disturbance activities.		

Indicate what parts of the form have been completed for the activity described above:

Part	Purpose	Requirement	Tick parts completed
B	Risk Assessment	To be completed if decision tree in Part A indicates that intentional or unintentional soil movement will occur during the activity.	✓
C	DMP	To be completed if risk is assessed in Part B to be 'High' or 'Moderate'	✓
		Dieback Management Plan No. <i>Allocated by District</i>	N/A



PART B: RISK ASSESSMENT

Step 1: MOISTURE conditions

Higher moisture during a disturbance activity increases the likelihood that soil will stick to a carrier (e.g. vehicles, equipment and/or footwear). Tick the box adjacent to the moisture conditions that are forecast for the period of the activity. If the activity will continue for an extended period, planning should consider the highest possible risk (wettest) conditions that may occur. If the activity is planned for dry conditions but the conditions change to become wetter prior to or during the activity, a contingency plan is required.

Dry soil	where dust forms when exposed soil is disturbed	✓
Moist soil	where soil is damp but does not stick to tyres, equipment and/or footwear	
Wet soil	where soil and moisture combine so that soil sticks to tyres, equipment and/or footwear	

Step 2: Determine the LIKELIHOOD of introducing or spreading dieback

Circle the description in each column that best describes the activity. An activity may fit between descriptions, in which case write a description into the appropriate blank cell.

The overall likelihood rating is determined by the criteria with the highest rating.

Disturbance type (e.g. action)	Introduction of raw material	Access	Complexity of activity	Extent of activity	Duration of activity	Drainage	Unmanaged access	Likelihood rating
Heavy earth moving, tracked vehicles	Infested or unknown raw material	Access crosses water (irrespective of frequency)			Activity area disturbed & map expired so impossible to revalidate boundaries		Increased public access in area of high public use	Very likely
Soil disturbance over a distance		Activity requires frequent access to site	Highly complex	Vehicle traverses several mini-catchments	Activity extends over several wet seasons	Surface water increased		Likely
Soil disturbance at single points	Crushed rock with no organic fraction		Complex		Activity occurs during a single wet season		Increased public access, but access restricted and/or site remote	Possible
Rubber tyred vehicle, bicycle	'High confidence' uninfested raw material	Activity requires infrequent access to site		Single mini-catchment	Entry in short timeframe under dry conditions	Minimal increase in surface water		Unlikely
Human, animal traffic			Not complex	Point or human traffic	Single entry in short timeframe under dry conditions	No change to surface water on dune system	Activity does not alter frequency of access to site	Very unlikely



Step 3: Determine the CONSEQUENCE of introducing or spreading dieback

Determine the potential CONSEQUENCE that introducing or spreading dieback may cause by going through the table below systematically and circling the description in each column that best estimates the consequence.

The overall consequence rating is determined by the criteria with the highest rating.

Area put at risk	Predicted impact	Biodiversity and sensitive areas at risk	Consequence rating
Ongoing potential ¹ to completely infest all protectable areas in activity landscape unit ²	Predicted very high impact: (majority of species at the activity area are susceptible and/or introducing dieback will result in extinction of species or populations) or Wet areas which contain any <i>Banksia</i> species or jarrah	>1 threatened/priority plant or animal species, critical habitat, TEC and/or Ramsar wetlands that is susceptible to dieback and/or Old-growth jarrah forest	Severe
Potential to infest all protectable areas in activity landscape unit ¹	Predicted high impact: (many susceptible species and/or introducing the pathogen will result in loss of populations or localised extinction of species) or Where predicted impact cannot be determined, jarrah forest on upland areas	At least one threatened/priority plant or animal species, critical habitat, TEC and/or Ramsar wetlands that is susceptible to dieback and/or Sensitive neighbouring property	Significant
Potential to infest more than 5% of any protectable area or 4 ha's (whichever is greater – assessor may set a lower minimum protectable area where appropriate)	Predicted moderate impact: (moderate numbers of susceptible species and/or introducing the pathogen will result in a reduction in species/populations)		Intermediate
The assessment area is largely void of native plants susceptible to the pathogen and was mapped as Uninterpretable and Excluded in degraded/disturbed areas.	Predicted low impact (low numbers of susceptible species)	Fauna Habitat Zones	Minor
No protectable areas estimated within any related landscape unit and/or The area is already infested ³	No susceptible species and/or the activity area is in the 'excluded' category. or Introducing dieback will have no impact discernible outside natural variation ³	No threatened/priority plant or animal species; critical habitat; TEC; and/or Ramsar wetlands that are susceptible to dieback. or As the activity area is already infested there will be no increased risk to threatened species and communities present ³	Insignificant

¹ Ongoing potential for an area to become infested occurs when the disturbance activity involves construction of permanent infrastructure e.g. roads or camp sites especially high in the landscape

² Landscape unit is an area bounded by features such as creeks, ridges, saddles, open roads and/or freehold land

³ Provide a map showing evidence that area is infested and attach to the risk assessment

Step 4: Determine the overall dieback RISK rating

- Refer to the table below that corresponds to the soil MOISTURE conditions (Step 1)
- Circle where the LIKELIHOOD rating (Step 2) intersects the CONSEQUENCE rating (Step 3)

This is the overall dieback RISK rating for the activity.

DRY SOIL		CONSEQUENCE				
LIKELIHOOD	Disturbance examples	Insignificant	Minor	Intermediate	Significant	Severe
Very likely	tracked machines ripping, pushing soil	Low	Moderate	High	High	High
Likely	snigging/light surface skim over distance	Low	Moderate	Moderate	High	High
Possible	installing posts, exploration drilling	Low	Low	Moderate	Moderate	High
Unlikely	driving with rubber tyres	Low	Low	Low	Moderate	Moderate
Very unlikely	walking	Low	Low	Low	Low	Low

MOIST SOIL		CONSEQUENCE				
LIKELIHOOD	Disturbance examples	Insignificant	Minor	Intermediate	Significant	Severe
Very likely	tracked machines ripping, pushing soil	Low	High	High	High	High
Likely	snigging/light surface skim over distance	Low	Moderate	High	High	High
Possible	installing posts, exploration drilling	Low	Moderate	Moderate	High	High
Unlikely	driving with rubber tyres	Low	Low	Low	Moderate	High
Very unlikely	walking	Low	Low	Low	Moderate	Moderate

WET SOIL		CONSEQUENCE				
LIKELIHOOD	Disturbance examples	Insignificant	Minor	Intermediate	Significant	Severe
Very likely	tracked machines ripping, pushing soil	Low	High	High	High	High
Likely	snigging/light surface skim over distance	Low	High	High	High	High
Possible	installing posts, exploration drilling	Low	Moderate	High	High	High
Unlikely	driving with rubber tyres	Low	Moderate	Moderate	High	High
Very unlikely	walking	Low	Low	Low	Moderate	Moderate

Step 5: Can the RISK be reduced by altering the activity or conditions?

If the risk rating is 'High' consideration should be given to:

- Cancelling the activity which avoids the risk; or
- Postponing the activity until conditions are dry for activities scheduled during moist or wet conditions.

If cancelling or postponing is not possible the activity should be re-assessed to determine if the risk can be reduced by altering some of the parameters of the activity. For example, tyred machinery generally causes less soil disturbance and are easier to clean, compared to tracked machines which cause more damage and pick up soil in the cleats which is hard to remove. Refer to the appendices for further guidance on reducing risk associated with an activity.



Step 6: Determine requirements based on RISK rating

Tick the box adjacent to the RISK rating of the activity as determined by the risk table.

High	<ul style="list-style-type: none"> Complete Part C based on valid comprehensive dieback interpretation with Regional Manager (or delegate) approval before implementation, and sign-off after close-out Green Card training¹ for all proponents and contractors involved in activity 	
Moderate	<ul style="list-style-type: none"> Complete Part C based on valid comprehensive dieback interpretation OR conditional dieback occurrence information with Regional Manager (or delegate) approval before implementation, and sign-off after close-out Green Card training¹ for proponent and contractors involved in activity 	✓
Low	<ul style="list-style-type: none"> Part C not required. Activity can proceed using basic dieback management Green Card training¹ for all proponents and contractors involved in activity 	

¹ Green Card training is mandatory for nominated departmental staff

Step 7: Risk Assessment sign-off

	Full Name	Position	Signature	Date
Risk Assessment conducted by:	B. Rikli	DBCA Registered Dieback Interpreter	<i>Bruno Rikli</i>	04.11.2023
Risk Assessment checked by: <i>(Regional Manager or delegate)</i>				

Additional comments or conditions:

- Valid Phytophthora occurrence assessment was completed in October 2023 by a DBCA Registered Dieback Interpreter.
- Approximately 90% of the area is Uninterpretable (Coastal heath vegetation) and considered "Protectable".
- Approximately 10% of the area is Excluded due to historic disturbance, tracks, clearing and degraded to completely degraded vegetation condition and this area is Unprotectable.
- If Phytophthora disease was introduced to within the assessed area or its boundary, its impact would be very low to negligible in the assessment area due to the existing native vegetation community on calcareous and alkaline coastal soils where predominantly susceptible plant species are absent.
- Dieback management for this site and the proposed works should include:
 - Green Card training prior to commencement for all personnel undertaking clearing and earthworks.
 - A basic Dieback Management Plan primarily focused on initial disturbance operations, consideration of utilizing green bridges to enable free vehicle movements during construction, and applies to ongoing road/maintenance activities adjacent to undisturbed native vegetation to minimise the risk of pathogen spread and introduction.



PART C: DIEBACK MANAGEMENT PLAN

Dieback Management Plan No.
Allocated by District

Step 1: Dieback occurrence information & map *(supervising officer/proponent)*

Valid comprehensive occurrence information		or	Conditional occurrence information	
Interpreter report/map no. and/or name	Dieback Assessment Report_CW03713_BARK112023.V1		Source	

Step 2: DMP meeting *(supervising officer/proponent)*

Date:		Convened by:	NB. Addressed through Water Corporations project referral, DBCA consultation, Clearing Permit and associated project environmental approvals.
Attended by:			

Step 3: Risk management tactics *(supervising officer/proponent)*

Tactic no.	TACTICS TO BE DEPLOYED <i>Refer to the Appendices in the Phytophthora Dieback Management Manual for guidance</i>	To be implemented <i>(✓= required)</i>	Implemented <i>(initialled when complete)</i>	Checked <i>(initialled when checked)</i>
MOISTURE CONDITIONS				
1	Moisture conditions as per Part B/Step1 dry <input checked="" type="checkbox"/> moist <input type="checkbox"/> wet <input type="checkbox"/>			
2	Contingency in event that conditions become wetter than those planned for before or during the activity:			
	• postpone/cease activity	✓		
	• fall back to low-risk area (e.g. infested area)			
	• risk reassessed and new DMP developed based on wetter conditions	✓		
PROTECTABLE AREAS <i>(and other management boundaries)</i>				
3	Protectable area (and management unit boundaries within them) have been established in the field and are identified as P <input type="text" value="1"/> to P <input type="text" value="4"/> on the attached dieback management map	✓		
4	Management boundaries (unrelated to Protectable Areas) have been established in the field and identified on the management map e.g. mini-catchments, impact etc.	✓		
HYGIENE				
5	Clean on Entry (COE) points and No Soil Movement (NSM) roads identified on map and signs installed in-field (record COE numbers in appropriate boxes): <input checked="" type="checkbox"/> COE1 road access <input checked="" type="checkbox"/> COE1 and COE2 entering vegetation / protectable areas <input type="checkbox"/> COE-NSM	✓		
6	<input type="text"/> COE gates installed and indicated on map against COE no.	✓		



Tactic no.	TACTICS TO BE DEPLOYED <i>Refer to the Appendices in the Phytophthora Dieback Management Manual for guidance</i>				To be implemented <small>(✓= required)</small>	Implemented <small>(initialled when complete)</small>	Checked <small>(initialled when checked)</small>
7	turnarounds for COE points, numbered and marked on map N/A						
8	COE points	1, 2, 3	To be gated with security out of operating hours.		when the operation is to cease for	✓	
	weeks, and on completion of all activities all temporary COE will be closed to Type by the proponent						
9	Cleandown points established in field and indicated on map How is effluent to be managed for wet cleandown? Excavate temporary sump low in profile that drains into Excluded areas to capture hardstand cleandown areas water runoff to avoid effluent entering Uninterpretable Protectable areas.				✓		
10	Machines and vehicles with portable hygiene kits				✓		
11	Records kept (circle relevant): COE clean down NSM				✓		
12	Management points (if applicable) numbered on map. Provide detail below on the decision or action that must be taken at each management point: <u>M1: Inspect vehicles, machinery, equipment and footwear are free of soil, mud or plant material as well as weeds and other contaminants before entering bushland at this point.</u>						
TRAINING AND COMMUNICATION							
13	Staff/contractors with Green Card training				✓		
14	DMP briefings (circle relevant): at commencement weekly daily other						
DISTURBANCE							
15	Machinery type(s): • Vegetation clearing – Dozers/excavators/loaders/trucks (tyred & tracked TBD) • 4WD – with mobile plant (drill-rig) • Imported fill / road construction – Loaders, dozers, graders & trucks			Machine Nos:		✓	
RAW MATERIALS							
16	Type: Limestone	Supplier/Source: Onsite & other TBD			✓		
17	Status (attach evidence):						
ACCESS							
18	Disease Risk Area permit obtained if required (attach copy) N/A						
19	Access route planned to place least amount of protectable area downslope at risk, and shown on map				✓		
20	Road maintenance uses tactics to mitigate harm to protectable areas: use interpreted boundaries				✓		
24	push soil downslope only						
22	clean bucket, shovel, auger after digging culverts/holes				✓		
23	use uninfested/low risk material to patch road				✓		



24	CoE 1,2,3	Roads to be closed, each road closure is numbered and marked on map (gated) Sand tracks entering the boundary to be closed are marked X on the DMP.	✓		
25		Each road closure has been constructed to effectively control access	✓		
26		Roads effectively closed/rehabilitated within <input type="text"/> weeks of end of activity			
27	Road construction uses tactics to mitigate harm to protectable areas:	located in infested/unprotectable categories when possible	✓		
28		low in profile	✓		
29		high crown for better drainage	N/A		
30		deep roadside drains & coarse material to minimise erosion	N/A		
31		mitre/offshoot drain preferentially located towards base of the slope	N/A		



Tactic no.	TACTICS TO BE DEPLOYED <i>Refer to the Appendices in the Phytophthora Dieback Management Manual for guidance</i>		To be implemented <small>(✓= required)</small>	Implemented <small>(initialled when complete)</small>	Checked <small>(initialled when checked)</small>
32	'Green bridge' implemented (mark on map) - TBD		✓		
33	Activity to be undertaken using split phase (provide detail)- N/A				
DURATION					
34	Duration of activity >1 year, engage Interpreter to recheck the boundaries IF APPLICABLE		✓		
EXTENT					
35	Divide area into management units for work in dry, moist or wet (circle relevant) N/A				
36	Select factors to be used to split dry, moist and wet soil management units	1	Protectability		
37		2	Presence of biodiversity values		
38		3	Predicted impact		
39		4	Potential for spread		
40		5	Machine/vehicle floatation		
41		6	Access prone to bogging		
42		7	Ability to control unmanaged access		
43		8	Distance from roads		
44	Operate to mini-catchments N/A				
DRAINAGE					
45	Drainage directed away from protectable areas, and drainage points numbered and marked on map TBD		✓		
46	Imported water	Source: TBD – Ensure mains supply			
47		Disinfectant type and dosage: N/A for mains water		✓	
WEEDS					
48	In areas infested with Declared/Prohibited or very high to moderate priority weeds, which are marked [] on the map, the proponent (circle appropriate): a) will not enter area b) will clean down machinery when leaving area N.B. TO BE MANAGED SEPARATELY THROUGH PROJECT SPECIFIC WEED MANAGEMENT PLAN.				
ADDITIONAL CONDITIONS					
49	All personnel / contractors undertaking clearing or earthworks disturbance activities to complete Green Card training prior to commencement.		✓		
50	Include site-specific Dieback awareness and management measures in all site inductions for disturbance activity personnel / contractors.		✓		
51	Maintain Clean-On-Entry & Clean Down records for compliance reporting.		✓		
52	Close all external unused sand tracks marked X on the DMP that enter the Development Envelope to avoid illegal offroad vehicle entry and risk of pathogen/weed introduction and spread.		✓		



Step 4: Dieback management map checklist *(supervising officer/proponent)*

Tactics decided on above should be clearly marked on the map using the symbols in brackets. Each point will have a unique no. (e.g. COE1; COE2; X1) and the total number recorded below (e.g. total 2 COE points; 1 road closure)
Note: staff and contractors in the field must be briefed and supplied with a management map

DMP No. recorded on management map <input type="text"/>	Road drainage points (D)- No. <input type="text"/>
Protectable areas and/or management units <input type="text"/>	Roads/areas with 'No Soil Movement' (NSM)- No. <input type="text"/>
'Clean on Entry' points (COE): No. <input type="text"/>	Road closures (X): No. <input type="text"/>
COE with gates (COE with gates): No. <input type="text"/>	Turnarounds and roads for rehab. (map legend)
Management points (M): No. <input type="text"/>	Access route (map legend)
Clean down locations (W): No. <input type="text"/>	

Step 5: Proponent sign-off *(external i.e. non-DBCA proponent)*

I, the undersigned, agree to implement the above DMP:

		Water Corporation		
Full Name	Position	Agency/Organisation	Signature	Date

Step 6: DMP approval *(Regional Manager or delegate)*

I, the undersigned, have reviewed the Risk Assessment and approved the DMP:

Full Name	Position	Signature	Date
Comment <i>(if required)</i>			

Step 7: DMP close-out *(supervising officer/proponent)*

All tactics identified in the DMP were implemented as approved?

Yes

No

Full Name	Position	Signature	Date
Comment <i>(if required)</i>			

Step 8: DMP sign-off *(Regional Manager or delegate)*

I, the undersigned, am satisfied that the DMP has been implemented and closed-out as approved:

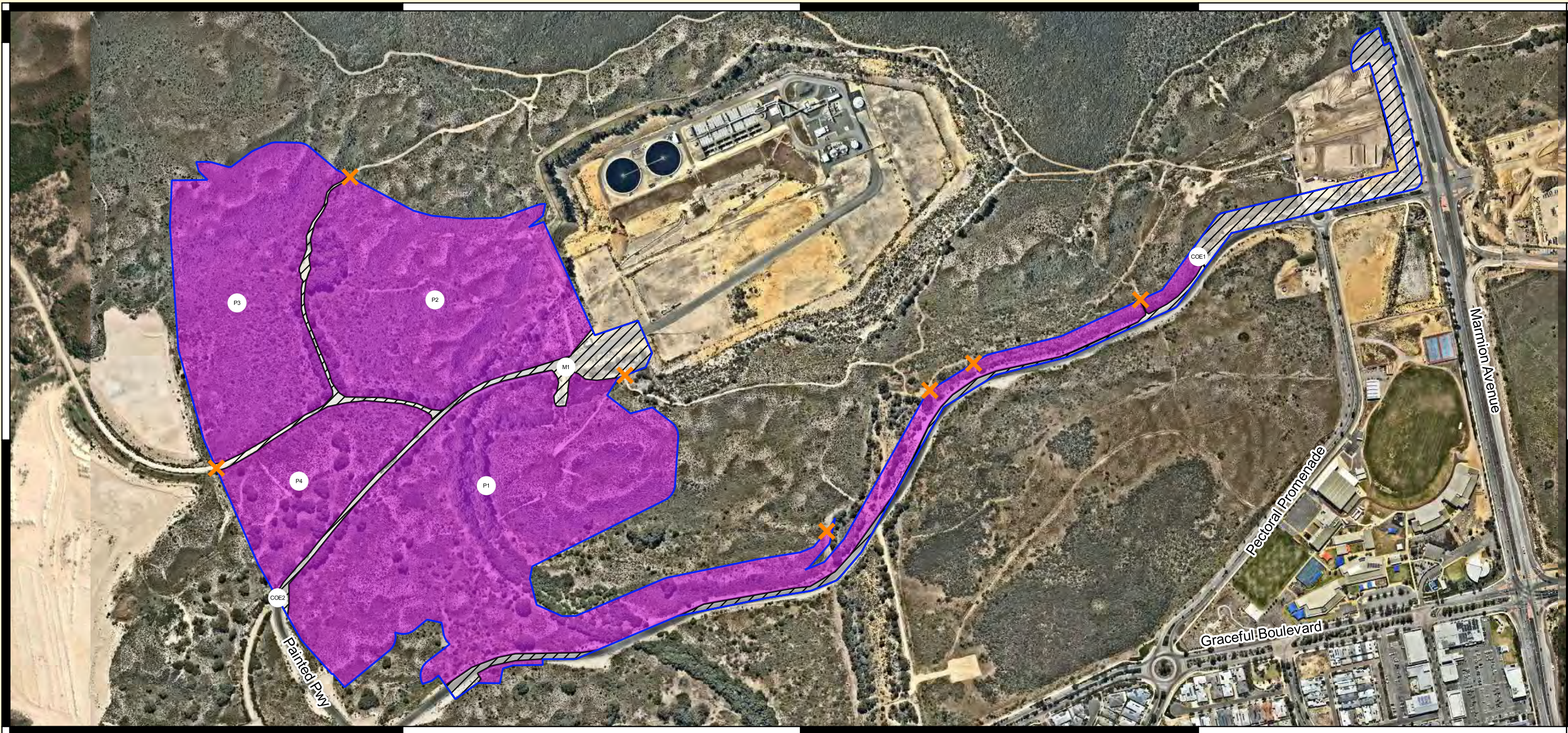
Full Name	Position	Signature	Date
Comment <i>(if required)</i>			



Step 9: Document management checklist

Records ticked below are filed in the following location:

	Dieback occurrence information (Interpretation report and map) have been uploaded to DAS or forwarded to Forest Management Branch at femweb@dbca.wa.gov.au
	Dieback Management Map
	Dieback Risk Assessment and Management Plan form (Parts A, B and C)
	COE and clean down records
	Disease Risk Area permit




- Legend**
- Assessment Area
 - Uninterpretable Area
 - Excluded Area
 - Unprotectable
- Dieback Management Points**
- COE Clean On Entry (COE)
 - M Management Point
 - P Protectable Areas
 - X Track Closures

Interpreter: B. Rikli
 Assessment completion: 21/10/2023
 Interpretation Method: Comprehensive & Linear

Map Validity:
 Map revalidation due on 21/10/2024. This map should not be used for operational purposes for more than 1 year after assessment completion. Map may be revalidated after a re-check assessment for up to 3 years following initial assessment (This map expires on 21/10/2026).

Map limitations:
 Information shown on this map is positioned relative to mapped features and was captured by hand-held GPS so it may not be entirely accurate. Therefore, field demarcation should be followed.

Area Statement	
Occurrence categories	Area (ha)
Infested	0.00
Uninfested	0.00
Uninterpretable (Protectable)	36.90
Temporarily Uninterpretable	0.00
Excluded (Unprotectable)	4.12
Total	41.02


 Datum: GDA 94
 Projection: MGA Zone 50

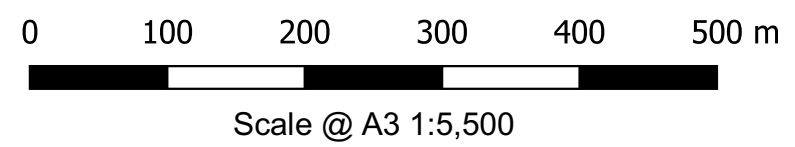


Figure 1:
CW03713 Alkimos SDP Earthworks - Dieback Management Plan

Bark Job:
 BARK_11_2023

Version 1

