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17 October 2022

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Delivered by email to: Aneesh.Toolsee@aurecongroup.com

Dear Aneesh

FLORA, VEGETATION AND FAUNA ASSESSMENT – PART LOT 963 ESTUARY DRIVE, VITTORIA

1 INTRODUCTION

1.1 Project background

Emerge Associates (Emerge) were engaged by Quantem to characterise the flora and vegetation values within part of Lot 963 Estuary Drive in Vittoria (referred to herein as the 'site'). The site is located approximately 200 kilometres (km) south of the Perth Central Business District within the Southern Port's Port of Bunbury.

The site comprises three areas which extend over approximately 12.09 hectares (ha) in size and are bounded by Leschenault Drive to the east and south, vacant land to the north and port facilities to the west. The location and extent of the site is shown in **Figure 1**.

Quantem are planning on building a bulk storage facility within area 1 of the site, which may include construction of a transport corridor within area 2. Area 3 is not proposed to be directly impacted but was surveyed as it may potentially be indirectly impacted.

Parts of area 1 and area 3 are subject to an existing approved native vegetation clearing permit (NVCP) (CPS 7825/1) under the current lease holder Alcoa of Australia Limited.

1.2 Purpose and scope of work

The scope of work was to undertake a flora, vegetation and fauna assessment within the site with reference to the Environmental Protection Authority's (EPA's) technical guidance (EPA 2016) (EPA 2020).

As part of this scope of work, the following tasks were undertaken:

- Desktop review of relevant background information pertaining to the site and surrounds, including database searches for conservation significant flora and fauna species and ecological communities.
- A field survey to record a comprehensive list of flora species and assess vegetation type and condition.

- Mapping of plant communities, vegetation condition and conservation significant flora and vegetation.
- Identification of potential habitat for conservation significant flora and fauna species and vegetation and an assessment of likelihood of occurrence.
- Documentation of the desktop assessment, methodology, field survey and results into a letter report.

2 METHODS

2.1 Database searches

A search was conducted for threatened and priority flora that may occur or have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2022), *NatureMap* (DBCA 2022) and DBCA's threatened and priority flora database (reference no. 95-0822FL).

A search was also conducted for TECs and PECs that may occur or have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2022), the *weed and native flora dataset* (Keighery *et al.* 2012) and DBCA's threatened and priority ecological communities' database (reference no. 62-0822EC).

A search was conducted for fauna species that have been recorded within a 10 km radius of the site using the *Protected Matters Search Tool* (DAWE 2022) and DBCA's conservation significant fauna database (reference no. 7359) and literature references.

Prior to undertaking the field survey, information on the habitat preferences of threatened and priority flora and fauna species and communities identified from database searches was reviewed. This was compared to existing environmental information available for the site, such as geomorphology, soils, regional vegetation and historic land use, to identify species and communities for which habitat may occur in the site.

2.2 Review of historical photography

A review of historical aerial photography available from 1970 indicates that the site originally comprised part of the Leschenault Estuary and immediate surrounds but was partially disturbed in 1970. By 1992 the site was reclaimed and comprised bare land with limited vegetation. The rows of trees in the northern portion of area 1 and the southern portion of area 2 appear to have been planted between 2004 and 2006 and the large sump in area 3 was created in between 2010 and 2012. Aerial imagery indicates this sump dries out periodically in summer and autumn but a drainage line leading to this sump is visible and appears to contain water throughout most available images.

2.3 Field survey

An ecologist from Emerge visited the site on 18 August 2022 to conduct the field survey.

The site was traversed on foot and the composition and condition of vegetation was recorded. Photographs were taken throughout the field visit to show particular site conditions. Flora species not native to Western Australia are denoted by an asterisk ('*') in text and raw data.

Plant specimens collected during the field survey were dried, pressed and named in accordance with requirements of the Western Australian Herbarium (2022). Identification of specimens occurred through comparison with named material and through the use of taxonomic keys.

The suitability of habitat within the site for conservation significant flora species, plant communities and fauna species was assessed. In particular, vegetation that may provide habitat for threatened species of black cockatoo[1] was recorded.

Vegetation condition was assigned at each sample and changes in vegetation condition were also noted and mapped across the site. The condition of the vegetation was assessed using the Keighery (1994) scale (**Table 1**).

Table 1: Vegetation condition scale applied during the field assessment

Condition category	Definition (Keighery 1994)
Pristine	Pristine or nearly so, no obvious signs of disturbance.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species.
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.
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.
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 very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
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.

2.4 Mapping and analysis

2.4.1 Conservation significant flora and communities

Based on the database searches and information recorded during the field survey, an assessment of the likelihood of occurrence of threatened and priority flora species and communities within the site was undertaken using the categories outlined in **Table 2**.

Table 2: Likelihood of occurrence assessment categories and definitions

Likelihood	Definition
Recorded	The species was recorded during the current field survey.
Likely	The site contains suitable habitat for the species and it is likely the species may occur based on presence of a recent historical record within or close to the site.
Possible	The site contains suitable habitat for the species but there is no other information to suggest that the species may occur within or close to the site.
Unlikely	The site does not contain suitable habitat for the species or the site contains suitable habitat for the species within which thorough targeted searches were completed and conclusion has been made that the species is unlikely to be present.

[1] *Zanda latirostris* (Carnaby's cockatoo), *Calyptorhynchus banksii naso* (forest red-tailed black cockatoo) and *Zanda baudinii* (Baudin's cockatoo).

2.4.1 Conservation significant fauna

Based on the results of the desktop assessment and information recorded during the field survey, an assessment of the likelihood of occurrence of conservation significant fauna within the site was undertaken using the categories outlined in **Table 3**.

Table 3: Likelihood of occurrence assessment categories and definitions

Likelihood of occurrence	Definition
Recorded	The species was recorded during the current field survey or during previous field surveys.
Likely	The site contains suitable habitat for the species and it is likely the species may occur based on presence of a recent historical record within or close to the site.
Possible	The site contains habitat of at least marginal quality and/or extent for the species and the site is located within the known distribution range of the species which is supported by recent literature records from near the site.
Unlikely	The site contains no or marginal habitat for the species and/or no recent literature records occur near the site.

2.4.2 Plant community identification and description

The plant communities within the site were identified from the sample data collected during the field survey. The vegetation was described according to the dominant species present using the structural formation descriptions of the *National Vegetation Inventory System* (NVIS) (NVIS Technical Working Group 2017). The identified plant communities were mapped on aerial photography from the sample locations and boundaries were interpreted from aerial photography and notes taken in the field. Vegetation condition was mapped on aerial photography based on the samples and notes recorded during the field survey to define areas with differing condition.

2.4.3 Threatened and priority ecological communities

Areas of native vegetation potentially representing a TEC or PEC were assessed against key diagnostic characteristics and, if available, size and/or vegetation condition thresholds.

3 RESULTS

3.1 General site conditions

The site comprises a disturbed landform and a freight railway line lies between area 1 and areas 2 and 3. Soils comprise sand with some clay (likely imported). A number of man-made low-lying sumps and drainage lines are present in the southern portion of the site, particularly just south and north of the railway line. These sumps and drainage lines contained standing water at the time of the survey.

Area 1 and 3 and the eastern portion of area 2 support predominantly non-native vegetation with scattered patches of native plants. The remainder of area 2 comprises hard stand.

3.2 Flora

3.2.1 Desktop assessment

The database search results identified a total of nine threatened and 42 priority flora species occurring or potentially occurring within a 10 km radius of the site. Information on these species including their habitat preferences and flowering period is provided in **Appendix A.**

Based on background information available for the site, suitable habitat was considered to potentially occur within the site for two threatened flora species and 16 priority flora species as shown in **Table 5**.

Table 4: Conservation significant flora species considered to have potential to occur in the site based on known habitat preferences

Species	Level of significance		Life strategy	Habitat	Flowering period
	WA	EPBC Act			
Austrostipa jacobsiana	CR	-	P	Grey sandy clay.	Nov-Jan
Austrostipa bronweniae	EN	-	P	Grey-brown sandy loam soil in low lying winter wet areas.	Sep-Nov
Bolboschoenus medianus	P1	-	P	Mud. In water and on river banks	Oct - Feb
Gastrolobium sp. Yoongarillup (S.Dilkes s.n. 1/9/1969)	P1	-	P	Unknown.	Unknown
Leucopogon sp. Busselton (D. Cooper 243)	P2	-	P	Seasonally wet areas on sand and sandy clay.	Aug-Sep
Schoenus loliaceus	P2	-	A	Sandy soils in winter-wet depressions.	Aug-Nov
Thelymitra variegata	P2	-	P	Sandy clay, sand, laterite.	Jun-Sep
Boronia tetragona	P3	-	P	Black/white sand, laterite, brown sandy loam in winter-wet flats, swamps, open woodland.	Oct-Dec
Chamaescilla gibsonii	P3	-	P	Clay to sandy clay in winter-wet flats, shallow water-filled claypans.	Sep
Dillwynia dillwynioides	P3	-	P	Winter wet depressions on sandy soils	Aug - Dec
Schoenus benthamii	P3	-	P	White, grey sand, sandy clay in winter wet flats and swamps.	Oct-Nov
Verticordia attenuata	P3	-	P	White or grey sand in winter-wet depressions.	Dec or Jan-May
Acacia flagelliformis	P4	-	P	Sandy soils in winter-wet areas.	May-Sep
Acacia semitrullata	P4	-	P	White/grey sand, sometimes over laterite, clay sometimes in sandplains, swampy areas.	May-Oct
Aponogeton hexatepalus	P4	-	P	Mud. Freshwater: ponds, rivers, claypans.	Jul-Oct
Microtis quadrata	P4	-	PG	Sand, loam or peat in winter wet areas	Oct-Dec
Ornduffia submersa	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov
Pultenaea skinneri	P4	-	P	Sandy or clayey soils in winter-wet depressions.	Jul-Sep
Rumex drummondii	P4	-	P	Winter-wet disturbed areas.	Aug-Nov

CR=critically endangered, EN=endangered, VU=vulnerable, P1-P4=Priority 1-Priority 4, P=perennial, PG=perennial geophyte.

3.2.2 Species inventory

A total of 20 native (including four planted) and 35 non-native (weed) species were recorded within the site during the field survey.

A complete species list is provided in **Appendix B**.

3.2.3 Threatened and priority flora

No threatened or priority flora species were recorded within the site.

The threatened and priority flora species identified in the desktop assessment are not considered to occur in the site due to lack of suitable habitat and/or because they were not recorded during the field survey.

The likelihood of occurrence results are provided in **Appendix A**.

3.2.4 Locally and regionally significant flora

No locally or regionally significant flora species were recorded within the site.

3.2.5 Declared pests

Two species listed as a declared pest (C3) pursuant to the BAM Act, **Asparagus asparagoides* (bridal creeper) and **Gomphocarpus fruticosus* (narrowleaf cotton bush), were recorded within the site.

Bridal creeper is also listed as a weed of national significance (WoNS).

3.3 Vegetation

3.3.1 Desktop assessment

The database search results identified eight TECs and eight PECs occurring or potentially occurring within a 10 km radius of the site. Information on these communities is provided in **Appendix C**.

Based geomorphology, soils and regional vegetation patterns, two TECs and four PECs were considered to have potential to occur in the site:

- 'Tuart (*Eucalyptus gomphocephala)* woodlands and forests of the Swan Coastal Plain' TEC which is listed as 'critically endangered' under EPBC Act and is a PEC in WA (P3).
- 'Subtropical and temperate coastal saltmarsh' TEC which is listed as 'vulnerable' under the EPBC Act and is a PEC in WA (P3).
- 'Southern *Eucalyptus gomphocephala-Agonis flexuosa* woodlands' which is a PEC in WA (P3).
- 'Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands' which is listed as a PEC in WA (P3).

3.3.2 Plant communities

Seven plant communities were identified within the site. A description and the area of each plant community is provided in **Table 5** and representative photographs of each are provided in **Plate 1** to **Plate 7**. The location of each plant community is shown in **Figure 3**.

Table 5: Description and extent of plant communities identified within the site

Plant community	Description	Area (ha)
AHc	Open shrubland to shrubland of *Acacia* spp. and *Hibbertia cuneifolia* over grass and forbland of dense pasture weeds (**Plate 1**)	0.47
As	Open shrubland to shrubland of *Acacia saligna* over grass and forbland of dense pasture weeds and bare ground (**Plate 2**)	0.55
BcGtSp	Sedgeland of *Bolboschoenus caldwellii* and *Gahnia trifida* over forbland of *Senecio pinnatifolius* over dense pasture weeds in shallow water (**Plate 3**)	0.1
Co	Open woodland of *Casuarina obesa* over grass and forbland of dense pasture weeds (**Plate 4**)	0.27
EgA	Planted rows of *Eucalyptus gomphocephala* trees over shrubland of *Acacia* spp. and *Hibbertia cuneifolia* over dense pasture weeds or bare ground. Also includes some scattered *Pinus radiata* trees (**Plate 5**)	0.46
T	Grassland of *Typha* sp. in sumps with standing water (**Plate 6**)	1.57
Non-native	Heavily disturbed areas comprising weeds with occasional native shrubs and forbs and planted non-native vegetation (**Plate 7**)	8.68

Plate 1: Plant community AHc in 'degraded' condition

Plate 2: Plant community As in 'degraded' condition

Plate 3: Plant community BoGtSp in 'degraded' condition

Plate 4: Plant community Co in 'degraded' condition

Plate 5: Plant community EgA in 'degraded' condition

Plate 6: Plant community T in 'degraded' condition

Plate 7: Non-native vegetation in 'completely degraded' condition

3.3.3 Vegetation condition

All plant communities were mapped as being in 'degraded' condition due to the high level of historical disturbance, high weed cover and low native species diversity.

Remaining areas in the site were mapped as being in 'completely degraded' condition as they are dominated by non-native species such as pasture grasses and planted trees and shrubs.

The extent of vegetation by condition category is detailed in **Table 5** and shown in **Figure 3.**

Table 6: Extent of vegetation condition categories within the site

Condition category (Keighery 1994)	Size (ha)
Pristine	0
Excellent	0
Very good	0
Good	0
Degraded	3.42
Completely degraded	8.68

3.3.4 Threatened and priority ecological communities

No TECs or PECs occur within the site.

The presence of tuart trees within plant community **EgA** indicated it may represent the Commonwealth listed 'tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain' TEC or State listed PEC of the same name. Assessment against the TEC criteria shows that it does not represent the TEC, as outlined in **Table 6**.

Table 7: Assessment of site conditions against the tuart (Eucalyptus gomphocephala) woodlands and forests of the Swan Coastal Plain TEC criteria (adopted from (DoEE 2019))

Criteria	Requirements for meeting criteria	Site implications
1. Must meet key diagnostic characteristics	• Located in appropriate bioregion and landform. • At least 2 living established *E. gomphocephala* trees with DBH≥ 15cm present in canopy layer and with <60 m between the outer edges of canopies^ • Vegetation structure is a woodland, forest, open forest, open woodland, or mallee (various forms).	• Site is located in appropriate bioregion and landform. • The patch contains more than two living established *E. gomphocephala* trees with DBH≥ 15cm present in canopy layer and with <60 m between the outer edges of canopies • Vegetation within the patch comprises a woodland to open woodland structure.
2. Must meet size threshold	• A patch must be larger than 0.5 ha#	• The patches are >0.5 ha.
3. Must meet condition thresholds	• Patches >5 ha: no condition threshold • Patches ≥0.5 – <2 ha: 'very high' or 'high' condition† • Patches ≥2 – ≤5 ha: 'very high', 'high' or 'moderate' condition†	• The patches comprise 0.65 ha and 2.29 ha and so are subject to condition thresholds. • The patches do not meet the condition thresholds.
4. Must incorporate surrounding context	• Breaks (e.g. tracks, cleared areas) < 30 m do not separate vegetation into separate patches • The site should be thoroughly sampled in the appropriate season. • Survey timing should be appropriate. • Surrounding environment should be considered (e.g. connectivity, conservation values, fauna habitat)	• Breaks such as tracks exist within each of the patches. • The survey timing was sufficient to determine whether the patch represents the TEC.
Result	The site does not support the tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC.	

^Includes dead trees. Where species of dead tree is unclear it is assumed to be *E. gomphocephala* if its canopy is within 60 m of an identified *E. gomphocephala tree*. #Note that a patch comprises a 30 m buffer around the canopy

of each *E. gomphocephala* canopy tree, may extend beyond a lot boundary and may include areas of bare ground, waterbodies and hardscape. †Using the condition scale provided in (DoEE 2019).

No other TECs or PECs occur within the site. The community likelihood of occurrence results are provided in **Appendix C**.

3.4 Fauna

3.4.1 Desktop assessment

The database search results identified a total of 45 conservation significant fauna species occurring or potentially occurring within a 10 km radius of the site.

Three fauna species of conservation significance were considered to possibly occur within the site, due to presence of suitable habitat: *Calyptorhynchus banksii naso* (Forest red-tailed black cockatoo), *Zanda baudinii* (Baudin's black cockatoo) and *Zanda latirostris* (Carnaby's black cockatoo). The site is not considered to support suitable habitat for other fauna species of conservation significance. The likelihood of occurrence assessment is provided in **Appendix D.**

3.4.2 Habitat

The fauna habitat values within the site have been compromised by the removal of most of the native vegetation and high level of historical disturbance.

Fauna habitat values for ground dwelling species are considered to be minimal due to lack of remnant native understory vegetation. Plant community **T** may provide habitat for waterbirds, particularly since it is located adjacent to Vittoria Bay.

Native and non-native trees within the site would provide habitat for widespread and common bird species.

3.4.3 Threatened and priority fauna

One threatened fauna species, Carnaby's black cockatoo (*Zanda latirostris*), was recorded within the site. Five individuals were observed resting in a *Casuarina obesa* tree in area 1 during the survey.

No other threatened or priority fauna species were recorded in the site. The site occurs within the known range and breeding range of forest red-tailed black cockatoo and Baudin's cockatoo and so these species may occur.

One black cockatoo habitat tree[2] was recorded in the northern portion of the site within area 1. This tree does not currently contain any hollows suitable for black cockatoo breeding. The location of the habitat tree in the site is shown on **Figure 2**.

Some of the trees within the site, such as the tuarts and *Eucalyptus* sp., would provide foraging and roosting habitat for black cockatoos. However, since the small size of patches of this vegetation (<1 ha), it would not be considered a high value foraging resource for black cockatoos. Overall, black cockatoo habitat within the site is limited in quantity and quality.

[2] 'Black cockatoo habitat trees' are defined as native *Eucalyptus* sp./*Corymbia* sp. known to support black cockatoo breeding with a diameter at breast height of at least 500 mm.

4 DISCUSSION

Native vegetation within the site is highly disturbed and shows evidence of ground disturbance so it is likely that the native vegetation present has established from the soil seed bank or seeds introduced from the local area.

It is considered unlikely that any threatened or priority flora species occur within the site that would have been undetectable at the time of the survey due to the high level of disturbance and weed invasion.

The areas comprising tuart trees (**EgA** vegetation) do not meet the condition thresholds to comprise part of the tuart woodlands TEC due to scattered native understorey cover and low species diversity combined with small patch sizes.

5 DEVELOPMENT IMPLICATIONS

In Western Australia native vegetation is protected under *Environmental Protection Act 1986 (EP Act) and Environmental Protection (Clearing of Native Vegetation) Regulations 2004* and cannot be cleared without a permit or valid exemption. Native vegetation exists within the site as scattered plants. Based on our initial review, there is no indication that a valid exemption applies to the clearing of native vegetation within the site.

Alcoa currently holds an authorised clearing permit for the majority of the site (CPS 7825/1). Condition 4 of CPS 7825/1 states that the permit holder (Alcoa) may authorise persons to clear native vegetation for the purposes of the permit. Therefore, Quantem may be able to undertake actions undertaken under CPS 7825/1. Note that CPS 7825/1 expires on 24 February 2023 and so a request to extend the clearing permit duration may be required to be submitted to DWER.

At a Commonwealth level, fauna taxa may be listed as 'matters of national environmental significance' (MNES) under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Any action likely to have a significant impact on an MNES listed under the EPBC Act requires Ministerial approval.

Western Australian black cockatoos are listed as an MNES under the EPBC Act. The Department of Climate Change, Energy, the Environment and Water (DCCEEW, previously Department of Agriculture, Water and the Environment), recently released referral guidelines for three Western Australian black cockatoo species (DAWE 2022). The guidelines provide advice on what actions are likely to require a referral. Consideration of black cockatoo breeding, roosting and foraging habitat is required to determine whether a significant impact is likely. Impacts and whether a referral to the minister is required will depend on the individual circumstances of the project and impact.

The vegetation in the site would provide foraging, breeding and roosting habitat for black cockatoos. The foraging habitat within the site is less than one hectare and so according to DAWE (2022b), clearing of this vegetation is 'unlikely to require a referral to the minister' (DAWE 2022b). The one 'black cockatoo habitat tree' within the site meets the Commonwealth's definition of a 'potential nesting tree' (DAWE 2022b). The recently released guidelines indicates that the 'loss of any potential nesting habitat is likely to require a referral to the minister' under the EPBC Act. However, it is unlikely that removal of the one habitat tree within the site would be considered a 'significant impact'. This is because the habitat tree does not contain any hollows suitable for black cockatoos and therefore does not currently provide breeding habitat. Ultimately an EPBC Act referral is the only pathway to categorically determine if an impact is significant and it is a proponent's responsibility to determine whether a EPBC Act referral is required.

The sumps present north and south of the railway line appear to currently be used for drainage from the adjacent port facilities and the native vegetation present appears to adapt to the changing water

levels over time. Depending on the extent of changes to the drainage regime from the proposed development, monitoring of water quality and/or vegetation health may be required in future.

Summary and closing

The site contains limited flora and vegetation and fauna habitat values, as summarised below:

- The majority of the site supports non-native vegetation.
- Native vegetation occurs mainly as scattered plants. Plant community **T** within area 3 is dominated by one species of native grass (*Typha* sp.) but appears to be regrowth following historic disturbance.
- The vegetation is in degraded and completely degraded condition.
- No habitat for threatened or priority flora occurs within the site.
- No TECs or PECs occur within the site.
- Fauna habitat values are generally low.
- One 'black cockatoo habitat tree' occurs in the site but it does not currently provide breeding habitat for black cockatoos. Small areas of low-quality black cockatoo foraging habitat occur within the site.

Yours sincerely
Emerge Associates

Rachel Weber
SENIOR ENVIRONMENTAL CONSULTANT – ECOLOGY TEAM LEADER

Encl: Figure 1: Site locality
Figure 2: Plant communities and potential habitat trees
Figure 3: Vegetation condition
Appendix A: Likelihood of occurrence of conservation significant flora species
Appendix B: Species list
Appendix C: Likelihood of occurrence of conservation significant communities
Appendix D: Likelihood of occurrence of conservation significant fauna species

General References

Department of Agriculture, Water and the Environment (DAWE) 2022, *Protected Matters Search Tool*, <https://pmst.awe.gov.au/#>.

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Figures

Figure 1: Site Locality

Project: Flora, Vegetation and Fauna Assessment
Part Lot 963 Estuary Drive, Vittoria
Client: Quantem

Plan Number:
EP22-080(01)--F01

Drawn:	GAR
Date:	31/08/2022
Checked:	SKP
Approved:	RAW
Date:	31/08/2022

N

0 50 100 150
Metres

Scale: 1:5,000@A4

GDA 1994 MGA Zone 50

emerge ASSOCIATES

Figure 2: Plant Communities and Potential Habitat Trees

Project: Flora, Vegetation and Fauna Assessment
Part Lot 963 Estuary Drive, Vittoria
Client: Quantem

Plan Number:
EP22-080(01)--F02

Drawn:	GAR
Date:	31/08/2022
Checked:	SKP
Approved:	RAW
Date:	31/08/2022

N

0 50 100 150
Metres
Scale: 1:4,000@A4
GDA 1994 MGA Zone 50

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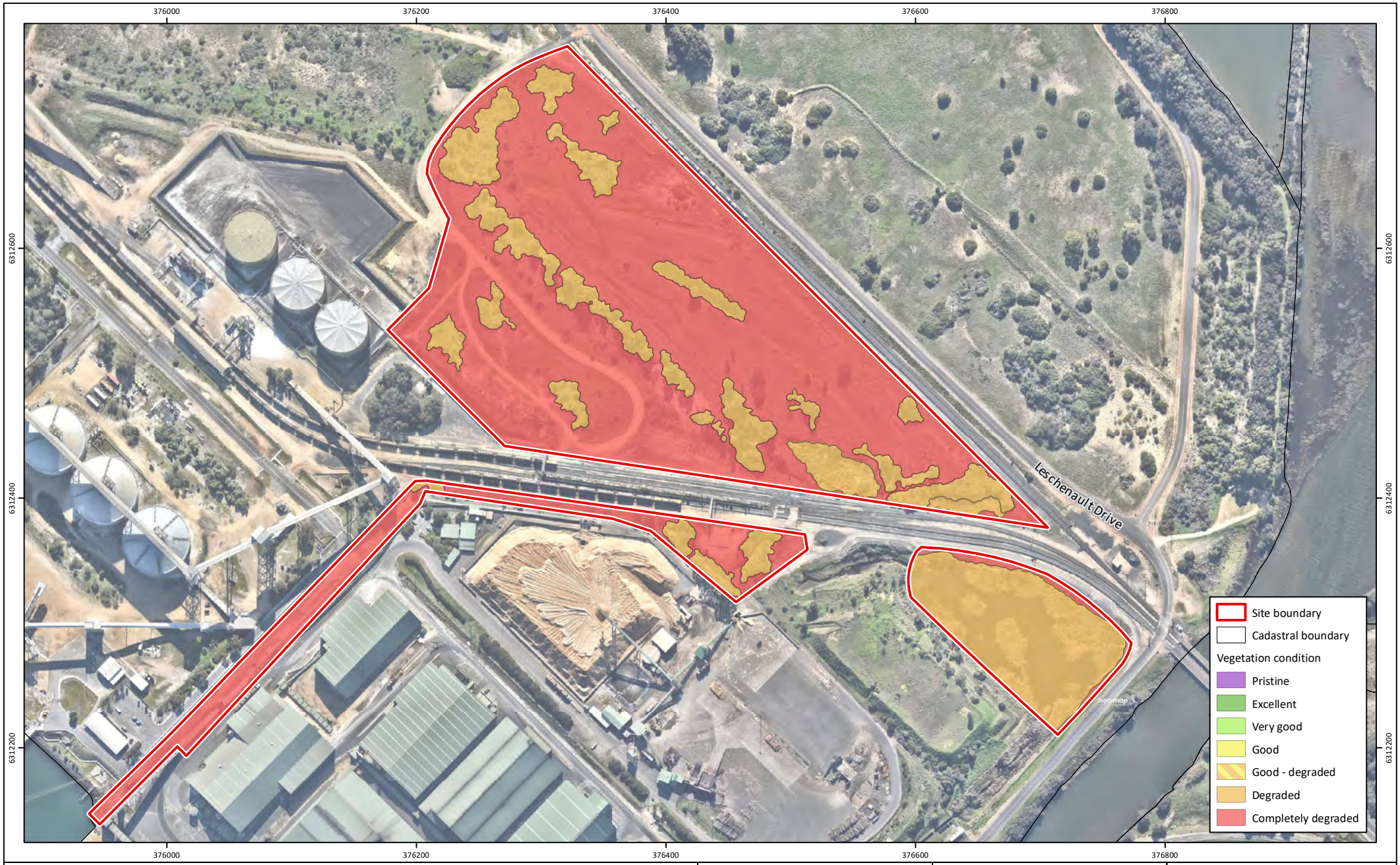

Figure 3: Vegetation Condition

Project: Flora, Vegetation and Fauna Assessment
Part Lot 963 Estuary Drive, Vittoria
Client: Quantem

Plan Number:
EP22-080(01)--F03

Drawn:	GAR
Date:	31/08/2022
Checked:	RAW
Approved:	SKP
Date:	31/08/2022

N

0 50 100 150
Metres
Scale: 1:4,000@A4
GDA 1994 MGA Zone 50

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Appendix A

Conservation Significant Flora Species and likelihood of Occurrence Assessment

Species name	Level of significance		Life strategy	Habitat	Flowering period	Likelihood of occurrence
	WA	EPBC Act				
Caladenia huegelii	CR	EN	PG	Well-drained, deep sandy soils in lush undergrowth in a variety of moisture levels.	Sep-early Nov	Unlikely
Drakaea elastica	CR	EN	PG	Bare patches of sand within otherwise dense vegetation in low-lying areas alongside winter-wet swamps. Typically in banksia woodland or thickets of Kunzea glabrescens.	late Sep-Oct/Nov, survey Jul-Aug	Unlikely
Synaphea sp. Fairbridge Farm (D. Papenfus 696)	CR	CR	P	Low woodland on grey, clayey sand with lateritic pebbles (Pinjarra Plain) near winter wet flats.	Sep-Nov	Unlikely
Austrostipa jacobsiana	CR	-	P	Grey sandy clay.	Nov-Jan	Unlikely
Drakaea micrantha	EN	VU	PG	Open sandy patches often adjacent to winter-wet swamps.	Sept- early Oct	Unlikely
Austrostipa bronweniae	EN	-	P	Grey-brown sandy loam soil in low lying winter wet areas.	Sep-Nov	Unlikely
Diuris drummondii	VU	VU	PG	In low-lying depressions in peaty and sandy clay swamps.	Nov-Jan	Unlikely
Diuris micrantha	VU	VU	PG	Dark grey-black sandy clay-loam in winter wet depressions or swamps. Often in shallow standing water.	Aug/Sep-early Oct	Unlikely
Eleocharis keigheryi	VU	VU	P	Clay or sandy loam in freshwater creeks and transient waterbodies such as seasonally wet clay pans.	Aug-Dec	Unlikely
Gastrolobium sp. Yoongarillup (S.Dilkes s.n. 1/9/1969)	P1	-	P	Unknown.	Unknown	Unlikely
Puccinellia vassica	P1	-	A/P	Saline soils on the outer margins of coastal saltmarshes.	Oct	Unlikely
Stylidium perplexum	P1	-	P	Grey-brown lateritic sand on slopes.	Nov-Dec	Unlikely
Synaphea odocoileops	P1	-	P	Brown orange loam and sandy clay, granite, in swamps and winter wet areas.	Aug-Oct	Unlikely
Bolboschoenus medianus	P1	-	P	Mud. In water and on river banks	Oct - Feb	Unlikely
Craspedia sp. Waterloo (G.J. Keighery 13724)	P2	-	P	Winter wet flats with clay and sandy clay in wandoo woodland.	Aug-Sep	Unlikely

	WA	EPBC Act				
Gastrolobium whicherense	P2	-	P	Red-grey sandy clay over quartzite on steep westerly slopes.	Oct	Unlikely
Grevillea rosieri	P2	-	P	Sandy soils.	Jul or Sep	Unlikely
Leptomeria furtiva	P2	-	P	Grey or black peaty sand in winter-wet flats.	Aug-Oct	Unlikely
Pterostylis frenchii	P2	-	PG	Calcareous sand with limestone, laterite on flatlands and gentle slopes.	Nov	Unlikely
Stylidium acuminatum subsp. acuminatum	P2	-	P	Brown lateritic loam soils on slopes.	Nov-Jan	Unlikely
Leucopogon sp. Busselton (D. Cooper 243)	P2	-	P	Seasonally wet areas on sand and sandy clay.	Aug-Sep	Unlikely
Schoenus loliaceus	P2	-	A	Sandy soils in winter-wet depressions.	Aug-Nov	Unlikely
Thelymitra variegata	P2	-	P	Sandy clay, sand, laterite.	Jun-Sep	Unlikely
Adelphacme minima	P3	-	A	Sandplains with grey sands. Sometimes in swamps.	Sep-Nov	Unlikely
Carex tereticaulis	P3	-	P	Black peaty sand.	Sep-Oct	Unlikely
Caustis sp. Boyanup (G.S. McCutcheon 1706)	P3	-	P	White or grey sand.	Jan-Feb	Unlikely
Lasiopetalum membranaceum	P3	-	P	Sand over limestone	Sep-Dec	Unlikely
Lomandra whicherensis	P3	-	P	Sand and sandy loam with lateritic gravel on slopes and ridges.	Dec	Unlikely
Platysace ramosissima	P3	-	P	Sandy soils.	Oct-Nov	Unlikely
Schoenus capillifolius	P3	-	A	Brown mud in claypans.	Oct-Nov	Unlikely
Stylidium paludicola	P3	-	P	Peaty sand over clay. Winter wet habitats. Marri and Melaleuca woodland, Melaleuca shrubland	Oct-Dec	Unlikely
Synaphea hians	P3	-	P	Sandy soils on rises.	Jul/Sep-Nov	Unlikely
Synaphea polypodioides	P3	-	P	Light brown loam, red-brown sandy loam, gravelly, brown sandy clay over laterite in undulating areas.	Sep-Nov	Unlikely
Angianthus drummondii	P3	-	A	Grey or brown clay soils, ironstone. On seasonally wet flats.	Oct-Dec	Unlikely
Boronia tetragona	P3	-	P	Black/white sand, laterite, brown sandy loam in winter-wet flats, swamps, open woodland.	Oct-Dec	Unlikely

	WA	EPBC Act				
Chamaescilla gibsonii	P3	-	P	Clay to sandy clay in winter-wet flats, shallow water-filled claypans.	Sep	Unlikely
Dillwynia dillwynioides	P3	-	P	Winter wet depressions on sandy soils	Aug - Dec	Unlikely
Schoenus benthamii	P3	-	P	White, grey sand, sandy clay in winter wet flats and swamps.	Oct-Nov	Unlikely
Verticordia attenuata	P3	-	P	White or grey sand in winter-wet depressions.	Dec or Jan-May	Unlikely
Caladenia speciosa	P4	-	PG	White, grey or black sand.	Sep-Oct	Unlikely
Chamelaucium erythrochlorum	P4	-	P	Sandy clay or sandy loam, sometimes with laterite. Creekbeds, slopes and ridges	Nov-Feb	Unlikely
Eucalyptus rudis subsp. cratyantha	P4	-	P	Loam on flats and hillsides.	Jul-Sep	Unlikely
Franklandia triaristata	P4	-	P	White or grey sand.	Aug-Oct	Unlikely
Acacia flagelliformis	P4	-	P	Sandy soils in winter-wet areas.	May-Sep	Unlikely
Acacia semitrullata	P4	-	P	White/grey sand, sometimes over laterite, clay sometimes in sandplains, swampy areas.	May-Oct	Unlikely
Aponogeton hexatepalus	P4	-	P	Mud. Freshwater: ponds, rivers, claypans.	Jul-Oct	Unlikely
Microtis quadrata	P4	-	PG	Sand, loam or peat in winter wet areas	Oct-Dec	Unlikely
Ornduffia submersa	P4	-	A	Sandy clay in inundated wetland/creek.	Aug-Nov	Unlikely
Pultenaea skinneri	P4	-	P	Sandy or clayey soils in winter-wet depressions.	Jul-Sep	Unlikely
Rumex drummondii	P4	-	P	Winter-wet disturbed areas.	Aug-Nov	Unlikely
Stylidium longitubum	P4	-	A	Sandy clay, clay. Seasonal wetlands.	Oct-Dec	Unlikely

Note: T=threatened, CE=critically endangered, E=endangered, V=vulnerable, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4, P=perennial, PG=perennial geophyte, A=annual.

Appendix B

Species List

Family	Status	Species
Anacardiaceae		
	*	*Schinus terebinthifolia*
Apocynaceae		
	*, DP	*Gomphocarpus fruticosus*
Arecaceae		
	*	*Washingtonia sp.*
Asparagaceae		
	*, DP, WoNS	*Asparagus asparagoides*
Asphodelaceae		
	*	*Asphodelus fistulosus*
	*	*Trachyandra divaricata*
Asteraceae		
	*	*Erigeron bonariensis*
	*	*Hypochaeris radicata*
	*	*Olearia axillaris*
		Senecio pinnatifolius
	*	*Silybum marianum*
Casuarinaceae		
		Casuarina obesa
Cyperaceae		
		Bolboschoenus caldwellii
		Ficinia nodosa
		Gahnia trifida
Euphorbiaceae		
	*	*Euphorbia terracina*
Fabaceae		
		Acacia cochlearis
		Acacia cyclops
		Acacia rostellifera
		Acacia saligna
	*	*Lotus angustissimus*
	*	*Lupinus cosentinii*
	*	*Medicago polymorpha*
	*	*Vicia sativa*
Geraniaceae		
	*	*Geranium molle*
	*	*Pelargonium capitatum*
Dilleniaceae		
		Hibbertia cuneiformis
Iridaceae		
	*	*Freesia alba x leichtlinii*
	*	Iridaceae sp.
Juncaceae		
		Juncus kraussii subsp. *australiensis*
		Juncus pallidus
Meliaceae		
	*	*Melia azedarach*
Myrtaceae		

Family	Status	Species
	P	*Callistemon phoeniceus*
	P	*Eucalyptus gomphocephala*
	*, P	*Eucalyptus sp.*
	*	*Leptospermum laevigatum*
	P	*Melaleuca lanceolata*
	P	*Melaleuca sp.*
Oleaceae		
	*	*Olea europaea*
Orchidaceae		
		Microtis media
Oxalidaceae		
	*	*Oxalis pes-caprae*
Phytolaccaceae		
	*	*Phytolacca octandra*
Pinaceae		
	*	*Pinus radiata*
Poaceae		
	*	*Briza maxima*
	*	*Cortaderia selloana*
	*	*Cynodon dactylon*
	*	*Ehrharta calycina*
	*	*Eragrostis curvula*
	*	*Lagurus ovatus*
	*	*Stenotaphrum secundatum*
Polygonaceae		
	*	*Rumex crispus*
Proteaceae		
		Adenanthos cygnorum
	P	*Grevillea crithmifolia*
Salicaceae		
	*	*Populus sp.*
Solanaceae		
	*	*Solanum nigrum*
Typhaceae		
		Typha sp.

*=non-native, Pl=planted; DP=declared pests, WoNS=weeds of national significance

Appendix C

Conservation Significant Communities and Likelihood of Occurrence Assessment

Code	Community name	TEC/ PEC	Level of significance		Likelihood of occurrence
			State	EPBC Act	
Banksia WL SCP	Banksia woodlands of the Swan Coastal Plain	TEC/ PEC	P3	EN	Does not occur
Tuart woodlands	Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain	TEC/ PEC	P3	CR	Does not occur
Claypans with shrubs over herbs	Claypans with mid dense shrublands of *Melaleuca lateritia* over herbs	TEC/ PEC	P1	CR	Does not occur
Coastal Saltmarsh	Subtropical and Temperate Coastal Saltmarsh	TEC/ PEC	P3	VU	Does not occur
SCP10a	Shrublands on dry clay flats	TEC	EN	CR	Does not occur
SCP19a	Sedgelands in Holocene dune swales of the southern Swan Coastal Plain	TEC	CR	EN	Does not occur
SCP21b	Southern *Banksia attenuata* woodlands	TEC/ PEC	P3	EN	Does not occur
SCP25	Southern *Eucalyptus gomphocephala-Agonis flexuosa* woodlands	PEC	P3		Does not occur
SCP29a	Coastal shrublands on shallow sands	PEC	P3		Does not occur
SCP30b	Quindalup *Eucalyptus gomphocephala* and/or *Agonis flexuosa* woodlands	PEC	P3		Does not occur
SCP3c	*Corymbia calophylla - Xanthorrhoea preissii* woodlands and shrublands, Swan Coastal Plain	TEC	CR	EN	Does not occur

Note: TEC=threatened ecological community, PEC=priority ecological community, CR=critically endangered, EN=endangered, VU=vulnerable, P3=priority 3

Appendix D

Conservation Significant Fauna Species and Likelihood of Occurrence Assessment

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Bird					
Calyptorhynchus banksii naso	Forest red-tailed black cockatoo	VU	VU	Eucalypt and Corymbia forests, often in hilly interior. More recently also observed in more open agricultural and suburban areas including Perth metropolitan area. Attracted to seeding Corymbia calophylla, Eucalyptus marginata, introduced Melia azedarach and Eucalyptus spp. trees.	Possible - foraging, roosting habitat and breeding habitat present.
Zanda baudinii	Baudin's black cockatoo	EN	EN	Mainly eucalypt forests. Attracted to seeding Corymbia calophylla, Banksia spp., Hakea spp., and to fruiting apples and pears (Johnstone and Storr 1998).	Possible - foraging, roosting habitat and breeding habitat present.
Zanda latirostris	Carnaby's black cockatoo	EN	EN	Mainly proteaceous scrubs and heaths and adjacent eucalypt woodlands and forests; also plantations of Pinus spp. Attracted to seeding Banksia spp., Hakea spp., Eucalyptus spp., Corymbia calophylla, Grevillea spp., and Allocasuarina spp. (Johnstone and Storr 1998).	Possible - foraging, roosting habitat and breeding habitat present.
Actitis hypoleucos	Common sandpiper	MI	MI	Edge of sheltered waters salt or fresh, e.g. estuaries, mangrove creeks, rocky coasts, near-coastal saltlakes (including saltwork ponds), river pools, lagoons, claypans, drying swamps, flood waters, dams and sewage ponds. Preferring situations where low perches are available (Johnstone & Storr 1998).	Unlikely - Marginal to no habitat present in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Apus pacificus	Fork-tailed swift	MI	MI	Aerial, migratory species that is most often seen over inland plains and sometimes above open areas, foothills or in coastal areas. Sometimes occurs over settled areas, including towns, urban areas and cities (Pizzey & Knight 2012).	Unlikely - Any occurrence of this species would be limited to the air space above the site.
Pandion haliaetus	Osprey	MI	MI	Coasts, estuaries, bays, inlets, islands, and surrounding waters; coral atolls, reefs, lagoons, rock cliffs, stacks (Pizzey & Knight 2012).	Unlikely - Marginal to no habitat present in the site.
Anous stolidus	Common noddy	MI	MI	Tropical and subtropical seas, cayes, reefs, buoys and	Unlikely - No suitable habitat
Anous tenuirostris melanops	Australian lesser noddy	EN	VU	Very common in blue-water seas around the Abrolhos (endemic to this area, accidental occurrences on lower west coast of Australia) (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Ardenna carneipes	Flesh-footed shearwater	VU	MI	Marine species that breeds on islands off south coast from near Cape Leeuwin (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Calidris acuminata	Sharp-tailed sandpiper	MI	MI	Occurs in tidal mudflats, saltmarshes and mangroves, as well as, shallow fresh, brackish or saline inland wetlands. It is also known from floodwaters, irrigated pastures and crops, sewage ponds, saltfields.	Unlikely - No suitable habitat occurs in the site.
Calidris canutus	Red knot	EN	EN (MI)	Mud and sand flats in estuaries and on sheltered coasts. Also near-coastal saltlakes, including saltwork ponds.	Unlikely - No suitable habitat occurs in the site.
Charadrius leschenaultii	Great sand plover	VU	VU (MI)	Wide sandy or shelly beaches, sandpits, tidal mudflats, reefs, sand cays, mangroves, saltmarsh, dune wilderness, bare paddocks, seldom far inland (Pizzey & Knight 2012).	Unlikely - Marginal habitat present in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Diomedea amsterdamensis	Amsterdam Island albatross	CR	EN (MI)	The Amsterdam albatross is a marine, pelagic seabird. It nests in open patchy vegetation (among tussocks, ferns or shrubs) near exposed ridges or hillocks (Weimerskirch et al. 1985). It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990)	Unlikely - No suitable habitat occurs in the site.
Diomedea dabbenena	Tristan albatross	CR	EN (MI)	The Tristan albatross is a marine, pelagic seabird. It forages in open water in the Atlantic Ocean near the Cape of Good Hope, South Africa. It sleeps and rests on ocean waters when not breeding (Marchant and Higgins 1990).	Unlikely - No suitable habitat occurs in the site.
Diomedea epomophora	Southern royal albatross	VU	VU (MI)	Rare visitor to Western Australian seas; it breeds on subantarctic islands south of New Zealand (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Diomedea exulans	Wandering albatross	VU	VU (MI)	Marine, pelagic and aerial species. It breeds on Macquarie Island and feeds in Australian portions of the Southern Ocean (DoE 2018).	Unlikely - No suitable habitat occurs in the site.
Diomedea sanfordi	Northern royal albatross	EN	EN	Species is marine, pelagic and aerial. Habitat includes subantarctic, subtropical, and occasionally Antarctic waters (Marchant & Higgins 1990). Rare visitors to south-western Australian waters.	Unlikely - No suitable habitat occurs in the site.
Falco hypoleucos	Grey falcon	VU	-	Species occurs in arid and semi-arid Australia, where it inhabits timbered lowland plains. In particular Acacia shrublands and that are crossed by tree-lined water courses. Species has also been observed hunting in treeless areas and frequenting tussock grassland and open woodlands (TSSC 2020).	Unlikely - No suitable habitat occurs in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Halobaena caerulea	Blue petrel	MI	VU (MI)	Marine species that breeds on southern subantarctic and northern artic islands. Only an accidental or uncommon visitor to Western Australian waters (Johnstone & Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Hydroprogne caspia	Caspian tern	MI	MI	Mainly sheltered areas, estuaries (when not laden with silt) and tidal creeks; occasionally near-coastal saltlakes (including saltwork ponds) and brackish pools in lower courses of rivers; rarely fresh waters.	Unlikely - No suitable habitat occurs in the site. Fly over possible.
Limosa lapponica	Bar-tailed godwit	MI (& VU or CR at subsp. level)	MI	Estuarine sand and mudflats and sandy beaches with loads of seaweed; also reef flats and near-coastal saltlakes (including saltwork ponds) (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Limosa lapponica menzbieri	Bar-tailed godwit	CR	CR	Mainly coastal habitats such as large intertidal sandflats, banks, mudflats, estuaries, inlets, harbours, coastal lagoons and bays. Has also been recorded in coastal sewage farms and saltworks, saltlakes and brackish wetlands near coasts, sandy ocean beaches, rock platforms, and coral reef-flats (Higgins and Davies 1996).	Unlikely - Marginal habitat present in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Macronectes giganteus	Southern giant-petrel	MI	EN (MI)	Breeds on southern subantarctic and antarctic islands. May visit Western Australian waters from February to December (mostly June to September) (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Macronectes halli	Northern giant petrel	MI	VU (MI)	Breeds on subantarctic islands. May visit Western Australian water from February to September (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Motacilla cinerea	Grey wagtail	MI	MI	In Australia mostly near running water in disused quarries, sandy and rocky streams in escarpments and rainforests, sewage ponds, ploughed fields and airfields (Pizzey & Knight 2012).	Unlikely - No suitable habitat occurs in the site.
Onychoprion anaethetus	Bridled tern	MI	MI	Tropical and subtropical seas, offshore islands, rarely coasts (Pizzey & Knight).	Unlikely - No suitable habitat occurs in the site.
Pachyptila turtur subantarctica	Fairy prion	-	VU	Breeds on subantarctic islands and is presumed to frequent subtropical waters during non-breeding period (TSSC 2015).	Unlikely - No suitable habitat occurs in the site.
Phoebetria fusca	Sooty albatross	EN	VU (MI)	Marine, pelagic species that tolerates a wide range of sea surface temperatures and salinities. breeds on subtropical and subantarctic islands in the Indian and Atlantic Oceans, on vegetated cliffs and steep slopes that are sheltered from prevailing winds, often amongst tussock grass.	Unlikely - No suitable habitat occurs in the site.
Pterodroma mollis	Soft-plumaged petrel	MI	VU (MI)	Marine species that breeds on temperate and subantarctic islands in south Atlantic and south Indian Ocean. Visitor to West Australian waters from March to September. Rarely observed inshore (Johnstone & Storr 1998).	Unlikely - No suitable habitat occurs in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Rostratula australis	Australian painted snipe	EN	EN	Mainly shallow terrestrial freshwater (occasionally brackish) wetlands, including temporary and permanent lakes, swamps and claypans (Marchant and Higgins 1993).	Unlikely - No suitable habitat occurs in the site.
Sternula nereis nereis	Australian fairy tern	VU	VU	Sheltered blue-water seas close to land, estuaries (when free of silt) and near-coastal lakes (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Thalassarche carteri	Indian yellow-nosed albatross	EN	VU (MI)	Marine species that inhabits seas of south and west coast of Western Australia and breeds on islands in the south Indian Ocean and in the south Atlantic (Johnstone & Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Thalassarche cauta	Shy albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Thalassarche impavida	Campbell albatross	VU	VU (MI)	Scarce visitor to south-western and western Australian seas. Breeds on Campbell Island.	Unlikely - No suitable habitat occurs in the site.
Thalassarche melanophris	Black-browed albatross	EN	VU (MI)	Seas of south and west coasts. Visitor to Western Australian mainland from January to early November (mostly May to September). Breeds on southern subantarctic and antarctic islands (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.
Thalassarche steadi	White-capped albatross	VU	VU (MI)	Scarce visitor (late May to mid-October) to southwestern and western seas. Breeds on islands off Tasmania and south New Zealand (Johnstone and Storr 1998).	Unlikely - No suitable habitat occurs in the site.

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Calidris ferruginea	Curlew sandpiper	CR	CR (MI)	Mainly shallows of estuaries and near-coastal saltlakes (including saltwork ponds) and drying near-coastal freshwater lakes and swamps. Also beaches and near-coastal sewage ponds.	Unlikely - No suitable habitat
Calidris melanotos	Pectoral sandpiper	MI	MI	Mainly fresh waters (swamps, lagoons, river pools, irrigation channels and sewage ponds); also samphire flats around estuaries and saltlakes (Johnstone & Storr 1998).	Unlikely - No suitable habitat
Numenius madagascariensis	Eastern curlew	CR	CR (MI)	Mainly tidal mudflats; also reef flats, sandy beaches and rarely near-coastal lakes (including saltwork ponds) (Johnstone and Storr 1998).	Unlikely - No suitable habitat
Tringa nebularia	*Common greenshank*	MI	MI	Mudflats, estuaries, saltmarshes, margins of lakes, wetlands, claypans (fresh and saline), commercial saltfields, sewage ponds (Pizzey & Knight 2012).	Unlikely - No suitable habitat
Botaurus poiciloptilus	*Australasian bittern*	EN	EN	In or over water, in tall reedbeds, sedges, rushes, cumbungi, lignum. Also occurs in ricefields, drains in tussocky paddocks and occasionally in saltmarshes and brackish wetlands.	Unlikely - No suitable habitat occurs in the site.
Fish					
Nannatherina balstoni	*Balston's pygmy perch*	VU	VU	Acidic, tannin-stained freshwater pools, streams and lakes in peat flats within 30 km of the coast of south-west Western Australia, preferring shallow water, and commonly associated with tall sedge thickets and inundated riparian vegetation (DAWE 2020).	Unlikely - No suitable habitat occurs in the site.
Mammal					

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		
Dasyurus geoffroii	*Chuditch*	VU	VU	Wide range of habitats from woodlands, dry sclerophyll forests, riparian vegetation, beaches and deserts. Appears to utilise native vegetation along roadsides in the wheatbelt (DEC 2012b).	No suitable habitat occurs in the site.
Pseudocheirus occidentalis	*Western ringtail possum*	CR	CR	On the Swan Coastal Plain in Agonis flexuosa woodlands and Agonis flexuosa/ Eucalyptus gomphocephala forests. Also Eucalyptus marginata forests (DBCA 2017).	No suitable habitat occurs in the site.
Setonix brachyurus	*Quokka*	VU	VU	On the mainland mostly dense streamside vegetation or shrubland and heath areas, particularly around swamps (Cronin 2007).	No suitable habitat occurs in the site.
Note: CE=critically endangered, EN=endangered, VU=vulnerable, CD=conservation dependent, MI=migratory, OS=other specially protected, P1=Priority 1, P2=Priority 2, P3=Priority 3, P4=Priority 4. Species recorded or considered to potentially occur within the site are shaded green.					

Species name	Common name	Level of significance		Habitat	Likelihood of occurrence
		WA	EPBC Act		

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