Attachment 1A: Clearing Permit Application

GOVERNMENT OF WESTERN AUSTRALIA

Department of Water and Environmental Regulation

Department of Mines, Industry Regulation and Safety

Application for new permit or referral to clear native vegetation

This is the form to submit a referral of proposed clearing or apply for a clearing permit under Part V of the *Environmental Protection Act 1986* (EP Act).

Before you submit this form, please check you have completed all the fields for the form type and fully prepared any required supporting documents (including maps etc.). We will return / decline any forms that are not correctly completed.

To find out more about the stages of assessment for clearing permit forms, see the *Procedure: Native vegetation clearing permits*.

Part 1 – Form type

Select your form type. NOTE: Where appropriate in this form, and unless stated otherwise, the terms 'application' and 'applicant' also mean 'referral' and 'referrer' respectively.	☐ Referral of proposed clearing (s.51DA of the EP Act) ☐ Application for an area permit (s.51E of the EP Act) ☒ Application for a purpose permit (s.51E of the EP Act)

Part 2 – Applicant details

2.1 Applicant name

For area permits:

If granted, the name(s) of (all) landowner(s) will be listed as 'permit holders' on the permit.

For purpose permits:

If granted, the name(s) of (all) applicant(s) will go on the permit.

☐ Applying as an individual – complete the following:

Title	☐ Mr ☐ Mrs ☐ Ms ☐ Other:	
Name(s)		

☐ Applying as a body corporate or other entity formed at law – complete the following:

Name	
Australian Company Number (ACN)	

☒ Applying as a government entity (e.g. government department, local government authority, or other statutory body)

Name	Rottnest Island Authority

2.2 Applicant contact details

Provide the contact details for the above (primary contact).

Title	☒ Mr ☐ Mrs ☐ Ms ☐ Other:		
First name	David		
Last name	Pond		
Position	Environment Compliance and Approvals Coordinator		
Company name	Rottnest Island Authority		
Contact phone number (1)	(+61) 451 154 505	Phone number (2)	n/a
Email address	david.pond@dbca.wa.gov.au		

2.2 Applicant contact postal details

Provide the postal address for the above individual, body corporate or local government authority (primary contact).

Address line 1	PO Box 693		
Address line 2			
Suburb	Fremantle		
State	WA	6959	

2.3 Applicant contact – registered business address

If applying as a company, incorporated body, local government authority or public authority, please also supply the registered business office address.

Address line 1	1 Mews Road		
Address line 2			
Suburb	Fremantle		
State	WA	Postcode	6160
Contact phone number (1)	(08) 9432 9300	Phone number (2)	n/a

2.4 Electronic correspondence consent

Both the Department of Water and Environmental Regulation (DWER) and Department of Mines, Industry Regulation and Safety (DMIRS) prefer to send all correspondence via email. We request that you consent to receiving all correspondence relating to instruments and notices under Part V of the EP Act via email. Please indicate your consent in this section of the form.

I consent that all written correspondence between myself (the applicant) and DWER/DMIRS (as applicable) about the subject of this form will be exclusively via email, using the email address provided above.	☒ Yes ☐ No

2.5 Contact details for enquiries

If different from the applicant's contact details, enter the contact details of a person with whom DWER or DMIRS should liaise with (e.g. a consultant).

Same as applicant's contact details	☒ Yes ☐ No

If 'No' – complete the following:

Contact name			
Position (if applicable)			
Company name (if applicable)			
Contact phone number (1)		Phone number (2)	
Business or postal address line 1			
Business or postal address line 2			
Suburb			
State		Postcode	
Email address			

Part 3 – Land details

- You must accurately describe the location of the land where your clearing is proposed.
- If you have a large number of properties, please provide the relevant details for each property in a separately attached supporting document.

3.1 Property details

I have a large number of properties and have given the relevant details in an attached supporting document.	☐ Yes – skip to Part 4 ☒ No

If 'No' – complete the following:

<u>Land description</u> Provide the following details, as applicable, for all properties: – volume and folio number – lot or location number(s) – crown lease or reserve number – pastoral lease number – mining tenement number	Lot 10976 on Deposited Plan 216860		
Street address – Line 1	Parker Point Road		
Street address – Line 2			
Suburb	Rottnest Island		
State	WA	Postcode	6161
Local government area(s)	City of Cockburn		
Land zoning	n/a		

Part 4 – Relationship to landowner

Tell us which of the following options best describes you as the person completing and submitting this form. If you are filling out this form on behalf of the applicant, answer this question as though you are the applicant.

Proof of ownership may include:

- a certificate of title (that is less than 6 months old)
- a pastoral or mining lease
- public authority that has care, control or management of the land
- other form of lease, land tenure or specific arrangement.

Relationship to landowner ***(select one of the following options)***	**Complete the following**
☒ I am the landowner	☒ Attach proof of ownership
☐ I am lodging a form on behalf of the landowner (e.g. a consultant)	☐ Attach proof of ownership
☐ I am acting on the landowner's behalf and will be jointly responsible for the clearing permit (i.e. joint form)	☐ Attach proof of ownership ☐ Complete and attach an 'Acting on behalf and jointly responsible' letter
☐ I am likely to become the landowner	☐ Attach the Certificate of Title ☐ Attach evidence of the pending transfer of ownership and/or contract of sale ('offer and acceptance')
☐ I will undertake the clearing activities with the landowner's authority and will be the permit holder	☐ Attach proof of ownership ☐ Complete and attach an 'Authority to access and clear native vegetation' letter (if the applicant is not the landowner)
☐ A person with multiple land parcels	☐ Attach proof of ownership ☐ Complete and attach 'Authority to access and clear native vegetation' letter (if the applicant is not the landowner)

Part 5 – Proposed clearing

5.1 Maps and/or spatial data

Select which map type(s) you will attach with your form. Note: We will decline / return forms (as applicable) if you do not provide sufficient information for this question.	☒ An ESRI shapefile with the following properties *(preferred)* • Geometry type: polygon shape • Coordinate system: Geocentric Datum of Australia (GDA) 2020 (geographic latitude / longitude) • Datum: GDA 2020 ☐ An aerial photograph or map with a north arrow, clearly marking the proposed clearing area Note: • An ESRI shapefile must use one of the following filename extensions: .shp, .shx, .dbf, and/or .prj • You must provide an ESRI shapefile if the form requires an assessment under an *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) accredited process. See Part 8 of this form for more information.

5.2 Size

- If you propose to clear a patch(s) of vegetation, enter a hectare value for the total size of the area (mark number of trees as zero).
- If you propose to remove only individual trees from the area(s) (i.e. the shrubs, grasses, groundcover plants will remain intact), provide the number of trees (and mark total area as estimated hectares).
  Note: If any shrubs, grasses, and/or groundcover plants MAY be damaged in the clearing process, add this to the total area.
- If you propose to clear an area of vegetation within a larger footprint, enter the hectare value for the total size of the area to be cleared (mark number of trees as zero) and the size of the footprint. For example, 5 hectares of clearing within a 10 hectare footprint. This option is only available for purpose permit applications.
- Enter values for BOTH number of trees and the size of the area if you are clearing individual trees in one area AND a patch of vegetation in a different area.
- Please note the following area conversions/calculations:

1 hectare = 10,000 m^2	Area of circle = 3.14 x $radius^2$
1 acre = 0.4 hectares / 4,000 m^2	Area of a rectangle = length x width
1 tree = 0.01 hectares / 100 m^2	Area of a triangle = ½ length x perpendicular height

Total area of clearing proposed (hectares)	**3.29**
Footprint of clearing (hectares) (purpose permit only)	**3.29**
Number of individual trees to be removed	**n/a**

Note: Calculate the area of a tree based on the area encompassed by the tree's drip line; that being the outermost circumference of the tree's canopy.

5.3 Purpose

Provide the reason for proposed clearing (e.g. road construction, grazing and pasture, hazard reduction, horticulture, timber harvesting etc.)	Construction of additional staff housing on Rottnest Island
Specify what the final land use will be after clearing	Staff housing

5.4 Method

Proposed method of clearing (i.e. burning, cutting, draining, flooding, grazing, mechanical clearing/bulldozing or other – specify)	Mechanical clearing

5.5 Timeframe

Period within which you propose to do the clearing (e.g. 1/7/2022 to 30/8/2024)	Start date: upon approvals being gained End date: 30/12/2025

Note: The clearing referral process is not suitable for any clearing that is expected to take longer than two years.

5.6 Avoidance and mitigation

Explain how you have, or will, put avoidance and mitigation measures in place to eliminate, reduce, or otherwise mitigate the need for and scale of the proposed clearing of native vegetation.

Attach supporting documents to substantiate your explanation.

Your explanation should demonstrate you have planned the project so that the least clearing possible is to be undertaken. The following questions may help you frame your explanation:

- Why did you select this location and amount of clearing?
- What alternatives to clearing – e.g. engineering solutions – did you consider?
- What changes, if any, did you make to the location or amount of clearing to reduce the impacts of the clearing?

Note: If you do not demonstrate adequate efforts to avoid and mitigate clearing, we will ask you to do so during the validation of this form.

Provide the avoidance and mitigation details	Please refer to supporting document titled ‘NVCP Cover Letter’

Part 6 – Offset

Do you want to submit a clearing offset proposal with your form? For more information on environmental offsets, refer to DWER's website and *Fact Sheet 11: Environmental offsets for native vegetation clearing permits*.	☐ Yes ☒ No
If 'Yes' – please complete and attach Appendix A of the *Clearing of native vegetation offsets procedure* guideline as a supporting document for your form.	☐ Appendix A attached

Part 7 – Surveys for assessments (IBSA and IMSA)

Do you want to submit marine or biodiversity surveys in support of your form?	☒ Yes ☐ No – skip to Part 8

7.1 Biodiversity surveys

If you want to submit any biodiversity surveys to support this form, you must follow the Environmental Protection Authority's (EPA) *Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments* (IBSA). If you do not meet the IBSA requirements, DWER/DMIRS (as applicable) may decline/return your form. For further information on IBSA, refer to DWER's website.

Please provide the IBSA number(s) – or submission number(s) if the IBSA number has not yet been issued – in the space provided. Note that a submission number is not confirmation that a biodiversity survey has been accepted and is not the same as an IBSA number. IBSA numbers are only issued once a survey has been accepted. Once an IBSA number is issued, please notify DWER / DMIRS (as applicable). Please note DWER / DMIRS will suspend the assessment timeframes for your form until you provide the IBSA number(s).

Have you submitted all the biodiversity surveys that support this form to the IBSA portal, via ibsasubmissions.dwer.wa.gov.au?	☒ Yes ☐ Not applicable
Provide an IBSA number (preferred) or a submission number(s)	IBSA-2022-0176

7.2 Marine surveys

If you want to submit any marine surveys to support this form, you must follow the EPA's *Instructions for the preparation of data packages for the Index of Marine Surveys for Assessments* (IMSA). If you do not meet the IMSA requirements, DWER may decline / return your form. For more information on IMSA, refer to DWER's website.

Have you prepared all the marine surveys that support this form in accordance with the EPA's *Instructions for the preparation of data packages for the Index of Marine Surveys for Assessments*?	☐ Yes ☒ Not applicable

Part 8 – Assessment Bilateral Agreement

The native vegetation clearing processes under Part V of the EP Act have been accredited by the Commonwealth of Australia under the EPBC Act and so can be assessed under an assessment bilateral agreement.

To be assessed this way, the proposed clearing action must have been referred to the Commonwealth under the EPBC Act and deemed a **'controlled action'** before you submit this form.

For further information, see DWER's website guidance on the assessment bilateral agreementhttps://www.der.wa.gov.au/our-work/clearing-permits/189-assessment-bilateral-agreement.

Is your proposed clearing a controlled action?	☐ Yes ☒ No – skip to Part 9

If 'Yes' – complete the following:

Please make sure you have entered all the mandatory details in the *Annex C7 form*	☐ *Annex C7 form* attached
List the controlling provisions identified in the notification of the controlled action decision	

Part 9 – Other approvals

Which department are you submitting this form to? If the clearing is for mineral and petroleum activities authorised under the *Mining Act 1978*, the various Petroleum Acts, and/or a State Agreement Act, select 'Department of Mines, Industry Regulation and Safety'. For all other clearing activities, select 'Department of Water and Environmental Regulation'.	☐ Department of Mines, Industry Regulation and Safety ☒ Department of Water and Environmental Regulation

9.1 Environmental impact assessment (Part IV of the EP Act)

Clearing may be referred to the EPA if it is considered to be part of a 'significant proposal', as defined by s.37B(1) of the EP Act, or will likely to be part of a larger development. An example is when the clearing is for a road to a future mine.

Section 37B(1) of the EP Act defines a 'significant proposal' as "a proposal likely, if implemented, to have a significant effect on the environment". If a decision-making authority (e.g. DWER or DMIRS) considers the proposal in this form is likely to constitute a 'significant proposal', under s.38(5) of the EP Act they must refer the proposal to the EPA or for assessment under Part IV, if such a referral has not already been made.

Has the proposed clearing or any related matter been referred to the EPA?	☐ Yes Enter details: [ ] ☒ No – complete question below.
If 'No' – do you intend to refer the proposal to the EPA?	☐ Yes – intend to refer (proposal is a 'significant proposal') ☐ Yes – intend to refer (proposal will require a s.45C amendment to the current Ministerial Statement) ☐ No – a current valid Ministerial Statement applies Enter Ministerial Statement number: [ ] ☒ No – not a significant proposal

9.2 Other approvals – pre-application scoping (DWER forms only)

Have you had any pre-application/ pre-referral/ scoping meetings with DWER about any planned applications?	☐ Yes Enter details: [ ] ☒ No

9.3 Other approvals – works approval, licence or registration (Part V Division 3 of the EP Act)

Have you applied for or do you intend to apply for a Part V Division 3 works approval, licence or registration, or the amendment or renewal of any of the above, under the EP Act or Environmental Protection Regulations 1987 (EP Regulations)? It is an offence to perform any action that would cause a premises to become a prescribed premises of a type listed in Schedule 1 of the EP Regulations, unless that action is done in accordance with a works approval, licence, or registration. For further guidance, see DWER's *Procedure: Prescribed premises works approvals and licences* and *Guideline: Industry Regulation Guide to Licensing*.	☐ Yes Application reference: [ ] ☐ No – a valid works approval or licence applies Works approval or licence number: [ ] ☐ No – a valid registration applies Registration number: [ ] ☒ No – not required

9.4 Water licences and permits (*Rights in Water and Irrigation Act 1914)*

Have you applied or do you intend to apply for: • a licence or amendment to a licence to take water (surface water or groundwater) • a licence or amendment to a licence to construct wells (including bores and soaks), or • a permit or amendment to a permit to interfere with the bed and banks of a watercourse? For further guidance on water licences and permits under the *Rights in Water and Irrigation Act 1914*, see DWER's *Procedure: Water licences and permits*.	☐ Yes ☐ No – a current valid licence or permit applies Licence or permit number: ☐ No – an exemption applies Enter details: ☒ Not applicable

Part 10 – Prescribed fee

10.1 Referral or application?

There are no prescribed fees for referrals. Is this form a referral of proposed clearing or an application for a new permit?	☐ Referral – skip to Part 11 ☒ Application – continue and complete Part 10

10.2 Calculating the application fees

You must pay the prescribed fee at the time you submit the application form.

Please calculate the prescribed fee using the online clearing permit fee calculator tool.

For further guidance, see DWER's online clearing fees frequently asked questions.

Calculated fee:	$2,600

10.3 Payment method

Fees are payable to:

- **DWER** for all clearing purposes other than mineral and petroleum activities

  OR
- **DMIRS** for mineral and petroleum clearing activities under the *Mining Act 1978*, various Petroleum Acts, or State Agreement Acts.

<table>
<tr>
<td>Please indicate how you would like to pay your application fee. Select one option only.

DWER will only accept fees paid via either:

• DWER's BPoint system (go to www.dwer.wa.ov.au/make-a-payment)
• secure EFT payment, or
• cheque/money order.

DMIRS will only accept fees paid via secure credit card payment at the DMIRS online payment and application lodgement portal.

Do not send cash in the mail.</td>
<td>☒ (DWER) Secure credit card payment through BPoint

See www.dwer.wa.gov.au/make-a-payment.

<table>
<tr><td>Receipt number</td><td></td></tr>
<tr><td>Date of payment</td><td></td></tr>
</table>

☐ (DWER) Secure EFT payment

See www.dwer.wa.gov.au/make-a-payment for payment details.

State the name of the intended permit holder clearly in the EFT payment subject.

<table>
<tr><td>Date of payment</td><td>11 December 2023</td></tr>
</table>

☐ (DWER) Cheque/money order

Please make cheques or money orders payable to the Department of Water and Environmental Regulation.

☐ (DMIRS) Secure credit card payment online at the DMIRS online payment and application lodgement portal.

Please note: All DMIRS applications will be paid online and submitted simultaneously. Please save this application form, along with any supporting documents, and have them ready for the submission portal. Use the link above to pay for and submit your application.

A receipt will be issued upon submission only. Please ensure this receipt is saved for your records.</td>
</tr>
</table>

For further information on fees, go to the clearing permit fees frequently asked questions page on DWER's website.

Part 11 – Form checklist

Please ensure you have included the following as part of your form. You may also attach additional information to support the assessment of your proposal; for example, reports on salinity, fauna or flora studies or other environmental reports for the site. You should submit these in electronic format on a suitable portable digital storage device.

Required

☒ Proof of land ownership (see attachment requirements in Part 4).

☒ An aerial photograph and/or map with a north arrow that clearly shows the areas of vegetation for proposed clearing or an ESRI shapefile (see Part 5).

☒ If this form is a permit application, payment of the prescribed fee (see Part 10).

As required

☐ Copy of written authority to act on behalf of landowner (see Part 4).

☐ Evidence of the pending transfer of land ownership, such as the offer and acceptance, or written notice from the current landowner.

☐ If you want the form to be assessed under the assessment bilateral agreement, include all details the *Annex C7* form asks for, such as 'Proposed clearing action and impact assessment details' and 'Consultation' information.

☐ If the form includes a proposal for clearing offsets, include Appendix A of the *Clearing of native vegetation offsets procedure* guideline.

☒ IBSA number.

Additional supporting information

☐ Photos of the area.

☐ Biodiversity surveys that follow the EPA's *Instructions for the preparation of IBSA data packages* or *Instructions for the preparation of IMSA data packages* (as applicable).

☒ Any other additional supporting information.

Part 12 – Request for exemption from publication

The information you submit as part of this form will be made publicly available. If you wish to submit commercially or otherwise sensitive or confidential information, please identify the information in this section, and include a written statement of the reasons why you request each item of information be kept confidential.

DWER and DMIRS will take reasonable steps under Part 3 of the Environmental Protection (Clearing of Native Vegetation) Regulations 2004 (the Clearing Regulations) to protect confidential material and/or otherwise sensitive information (such as information of a kind listed under r.13 of the Clearing Regulations).

However, please note that DWER and DMIRS cannot commit to redacting all personal information from all supporting documents. We advise you to remove all personal information, including signatures, from any supporting documents before you submit them to us. Please note that all the information you submit may become the subject of an application for release under the *Freedom of Information Act 1992* (WA) (FOI Act).

You must identify all information in this form or attached supporting documents that you propose to be exempt from public disclosure in the table below. You must then attach a separate redacted version of this form and its supporting documents. This is in addition to the unredacted version(s) you submit to DWER/DMIRS (as applicable) for assessment. You must specify the grounds for claiming an exemption in accordance with Part 3 of the Clearing Regulations.

<table>
<tr><td>Is any information in this form or in any attached supporting documents confidential or commercially sensitive?</td><td>☐ Yes
<table><tr><td>Specify what part of this form or relevant attachment</td><td></td></tr><tr><td>Specify grounds for claiming exemption from publication</td><td></td></tr></table>
☒ No</td></tr>
<tr><td>Attach file(s) with the relevant confidential information redacted</td><td>☐ File name:
☐ File name:
☐ File name:</td></tr>
</table>

Part 13 – Declaration

General

I / We declare and/or acknowledge that:

- the information I / we have provided in this form is true and correct
- I / we have legal authority to sign on behalf of the applicant (where authorisation provided)
- I / we have been authorised to make this form by the owner of the land (as applicable)
- I / we have not altered the requirements and instructions set out in this form
- I / we have provided a valid email address in Part 2 for receipt of correspondence via email from DWER or DMIRS (as applicable) in relation to this form
- successful delivery to my / our server constitutes receipt of correspondence and service of any statutory notices or instruments, and
- giving or causing to be given information that to my knowledge is false or misleading is an offence under s.112 of the EP Act and may incur a penalty of up to $100,000.

Publication

I / We declare and/or acknowledge that:

- this form (including all attachments) will be a public document and may be published, except for personal information including personal signatures, email and home addresses and any documents verifying my / our identity
- the marine surveys provided in accordance with Part 7 will be published and used for the purposes of the IMSA project, in accordance with your declaration made in the Metadata and Licensing Statement
- all necessary consents for the publication of information have been obtained from the relevant third parties
- the specification of the information identified in Part 12 constitutes a written request under r.11(2) of the Clearing Regulations not to publish that information due to its confidential or otherwise sensitive nature
- subsequent information provided to DWER or DMIRS (as applicable) in relation to this form will be a public document and will be published under r.8A of the Clearing Regulations, unless accompanied by a further written request under r.11(2) by the referrer or applicant that that information be treated as confidential
- in accordance with the requirements of r.11, r.12 and r.13 of the Clearing Regulations, DWER or DMIRS (as applicable) must refrain from publishing bank account details or confidential material (as defined under r.11(1) of the Clearing Regulations)
- DWER or DMIRS (as applicable) may refrain from publishing:
    - certain otherwise sensitive information identified in Part 12, if satisfied it is desirable to not publish due to the confidential nature of the information
    - personal information or certain otherwise sensitive information listed under r.13 of the Clearing Regulations.

Are you signing as an individual or a company? Note: A person expressly authorised or authorised to execute on	☐ An individual

behalf of a body corporate must sign this form.	☐ A company ☒ Other entity formed at law

☒ I hereby declare, the information provided is correct.

Signature			
Name	Jason Banks		
Date declaration signed	11/12/2023		
Position (if applicable)	Executive Director		
Company or organisation (if applicable)		ACN:	

Note that all persons who will be listed on any clearing permit granted for this application as holders of the permit must sign the application form. If more than one signature is required, attach all signatures together in a separate attachment.

Part 14 – Submission

14.1 Method of submission

Confirm how you will submit your form *(mark one option only)*. **To submit to DWER:** Files larger than 50MB cannot be received via email. You can email DWER to make other arrangements for electronic transfer. **To submit to DMIRS:** The DMIRS online portal can accept 1024MB for each attachment. Files larger than 45MB cannot be received via email. You can email DMIRS to make other arrangements for electronic transfer.	☒ A signed, electronic copy of the form, including all attachments, has been submitted via the applicable email address specified below **(if submitting form to DWER)**.
	☐ A signed, electronic copy of the form has been submitted via the applicable email address specified below, and attachments have been submitted via File Transfer, or electronically by other means as arranged with the relevant department **(if submitting form to DWER)**.
	☐ A full, signed hard copy has been sent to the applicable postal address specified below **(if submitting form to DWER)**.
	☐ A signed electronic copy of the form, fee payment, and any supporting documentation has been saved and uploaded to the *DMIRS online payment and application lodgement portal* **(if submitting form to DMIRS)**.

14.2 Submission details

- Please retain a copy of this form for your records.
- We will decline or return incomplete forms that do not meet the requirements for a valid referral or permit application (as applicable).
- If you do not have enough space on any part of this form, please continue on a separate sheet of paper and attach it to this form.

Department of Water and Environmental Regulation Forms for all clearing purposes (other than mining and petroleum activities) may be submitted via: **Email:** info@dwer.wa.gov.au **or** **Post:** Department of Water and Environmental Regulation Locked Bag 10 Joondalup DC WA 6919 If you have any questions about lodging your form, please contact DWER via: **Email:** info@dwer.wa.gov.au **Phone:** (08) 6364 7000 For more information: www.dwer.wa.gov.au	**Department of Mines, Industry Regulation and Safety** Forms related to mining and petroleum clearing activities (under delegation) can be lodged online via the *DMIRS online payment and application lodgement portal*. If you have any questions about lodging your form, please contact DMIRS via: **Email:** nvab@dmirs.wa.gov.au **Phone:** (08) 9222 3535 For more information: www.dmirs.wa.gov.au

MAKING COMPLEX EASY
A TETRA TECH COMPANY

Level 3, 500 Hay Street
Subiaco, WA 6008
T +61 8 9211 1111

Our ref: AU213012164.001

Date: 11 December 2023

Department of Water and Environmental Regulation
Locked Bag 10
Joondalup DC WA 6919

The Rottnest Island Authority respects the Whaduk people as the traditional custodians of Wadjemup

Dear Sir/Madam,

Clearing permit application: Parker Point Road, Rottnest Island

Please find attached a purpose permit clearing application to facilitate the building of staff accommodation at a site on Parker Point Road, Rottnest Island (Wadjemup).

The proposed clearing area (the site) is approximately 3.29hectares in size, comprising native vegetation. The site is at the southern end of a patch of extant native vegetation along Parker Point Road, terminating at Bickley Swamp and bounded by the railway line on the eastern side (Figure 1).

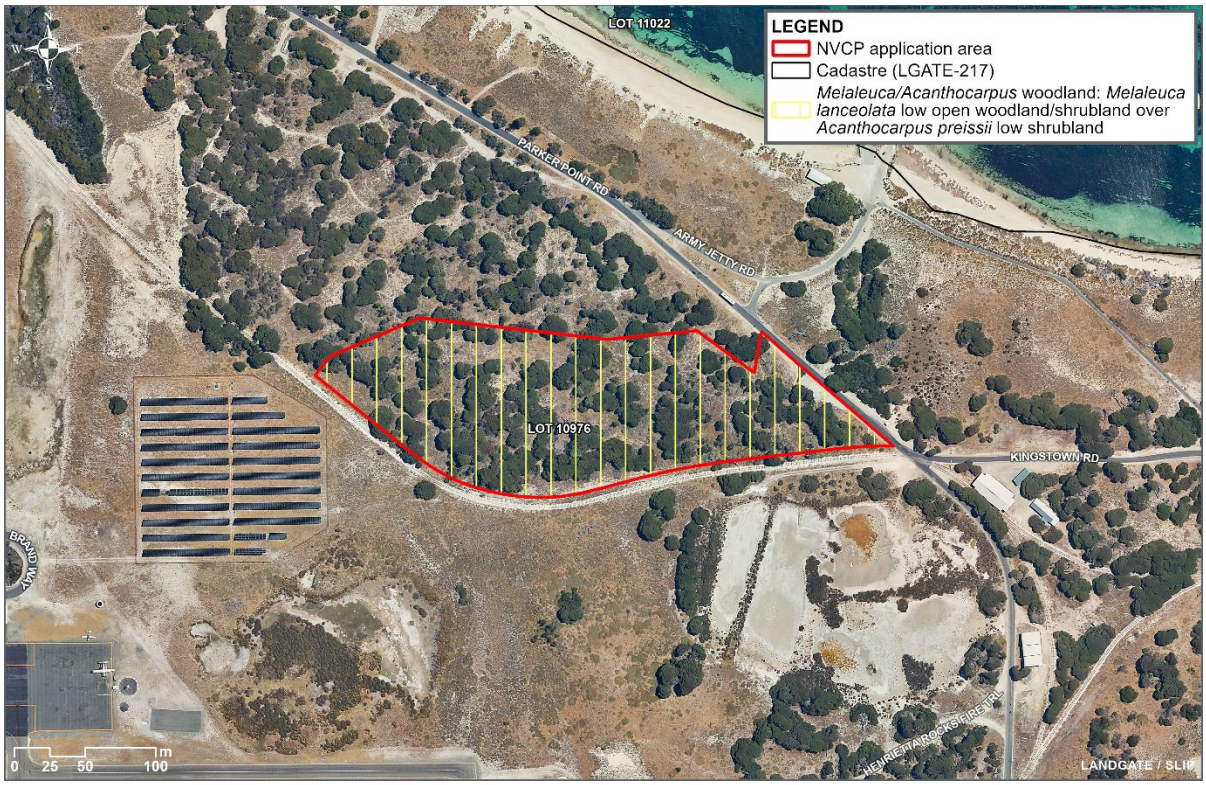

Figure 1 Site location and Native Vegetation Clearing Permit (NVCP) area

Background

The Rottnest Island Authority is seeking to clear the site to allow for the building of critical accommodation for workers employed by businesses on Rottnest Island.

This letter presents the results of an assessment of the clearing aspects of this proposal against the ten clearing principles as outlined in *A guide to the assessment of applications to clear native vegetation under Part V Division 2 of the Environmental Protection Act 1986* (Department of Environmental Regulation, 2014), and identifies the potential environmental impacts associated with the proposal. The proponent responsible for implementation of the clearing described in this letter is the Rottnest Island Authority, Department of Biodiversity, Conservation and Attractions (DBCA).

Site selection – Alternatives

The Rottnest Island Authority Act 1987, Section 14.1 'Limit on Development', only allows housing to be built within the Settlement area. The Settlement area comprises a small portion of the Island, approximately 15 percent, with the process of site selection a complex matter. In the determination of a suitable site, RIA considered the following Site Selection Criteria:

- Within the Settlement boundary (no buildings to be constructed outside of settlement boundary)
- Outside of known Environmentally Sensitive Areas
- Outside of known State Heritage registered areas
- Proximity to the Lodge redevelopment and Samphire resort to reduce the need for transport between the sites (walking distance - reduced congestion management)
- Connectivity to sewer
- Connectivity to water
- Connectivity to 3 phase power

Several sites were considered, however, the site of Parker Point Road meets all the necessary site selection criteria as set out below. A ranking scale was applied whereby 1 = does not meet criteria, up to 5 = meets the criteria.

Table 1 Site selection matrix

	Within settlement boundary	Outside known ESAs	Outside known heritage areas	Proximity to Rottnest Hotel and Samphire	Connectivity to sewer	Connectivity to water	Connectivity to 3 phase power	**Total Score**
Parker Point Road	5	3*	5	3	4	4	4	**28**
Garden Lake	5	1	5	3	1	1	1	**17**
Geordie Bay	5	5	5	2	1	1	1	**20**
PFM Yard	5	1	3	5	3	3	3	**26**

*Cannot be developed due to Bushfire constraints and partially within an ESA.

The Parker Point Road site was chosen based on the scores in the matrix.

Site overview

A flora survey was conducted in 2022 (Focused Vision Consulting, 2022) which included the area subject to this application. This survey is provided as Appendix B in the report *Flora and fauna assessment, Parker Point Road Rottnest: Native Vegetation Clearing Permit: Supporting Documentation* (360 Environmental, 2022) which is included as Attachment A to this application. RPS conducted a qualitative assessment of the

site to ground-truth the reported results of this report, with a memo describing the search included as Attachment B and both have been used to inform this application.

Regional geology and soils

Surface geology mapping indicates that the geology of the site comprises Tamala Limestone (Qd); unconsolidated to strongly lithified calcarenite with calcrete/kankar soils; aeolian. Locally quartzose, feldspathic, or heavy-mineral-bearing (360 Environmental, 2022).

The proposed clearing site largely comprises vegetated dunes to a height of approximately 8 -11 metres AHD (Topographic-Maps.com, 2023).

A freshwater lens underlies the island, floating on saltier water due to density differences with hypersaline lakes the result of saltwater intrusion. The principal method of recharge of this lens is by rainfall (Bryan,2017). The movement of water within this lens as groundwater seepage is towards the coast and lakes, with groundwater movement from the site expected to occur in a northerly direction towards Thomson Bay with potential for some flow toward Bickley Swamp to the south.

There is a cluster of 18 lakes and swamps in the north-eastern part of Wadjemup. Seven lakes are permanent, two are seasonal and the smaller swamps are mostly seasonal. Water supply to the cluster is by direct precipitation and by groundwater seepage, the supply to the small swamps is primarily by groundwater seepage (DCCEEW, 2023).

Flora and vegetation

Vegetation types

The entire site is mapped as the vegetation type; **MIAp** (360 Environmental, 2022). This vegetation type comprises *Melaleuca lanceolata* Tall Shrubland over *Acanthocarpus preissii* Low Open Shrubland. This vegetation type is analogous to Vegetation Association 15 of Shepherd *et al* (2018) as reported in 360 Environmental (2022) and described as 'Low Forest. Acacia, Rottnest pine, coastal moort or mixed forest *Acacia rostellifera, Callitris preissii, Eucalyptus lehmanii, E. cornuta* (360 Environmental, 2022). The regional representation of this vegetation type and extent remaining is provided in Table 1.

Table 2 Vegetation Association 15 extents (Government of Western Australia 2019 and 360 Environmental 2022)

Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Current extent in DBCA managed lands
Statewide Representation (Report 1a[1])			
2,374.16	1,576.52	66.40	56.23
Swan Coastal Plain Representation (Perth subregion SWA02, Report 3a[1])			
1,977.33	1,564.26	79.09	56.47
Local Government Area Representation (City of Cockburn[2], Report 4a[1])			
1,353.14	886.49	65.51	100

[1] Relevant report numbers within Government of Western Australia (2019)

[2] The City of Cockburn is the Rottnest Island Local Government Area.

The EPA considers that it is important that vegetation associations are maintained above the threshold level of 30% of the pre-European extent of the vegetation association as outlined in Guidance Statement No. 33 – *Environmental Guidance for Planning and Development*. The guidance recommends that vegetation associations with levels below the 30% threshold should be retained, where possible (EPA 2008). Vegetation Association 15 has a current extent above the abovementioned 30% threshold (Table 1).

Conservation significant vegetation

The vegetation type **MIAp** was assessed as being analogous to the state listed Threatened Ecological Community (TEC) '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described by Gibson *et. al.* 1994)'. This community is located on calcareous sandy soils of the Quindalup Dunes, generally occurring between Trigg and Point Peron, and on the Swan River at Peppermint Grove. It also occurs on Garden Island and Rottnest Island.

The TEC is characterised by the presence of the Rottnest Island Pine (*Callitris preissii*) and/or the Rottnest Island Tea Tree (*Melaleuca lanceolata*), the TEC was Gazetted as Critically Endangered in 2023 (State of Western Australia, 2023).

A report produced by 360 Environmental (2022) to support a previous clearing permit application (No. 9883/1- Appendix 1) also mapped the vegetation as analogous to the same TEC, and condition was mapped as Very Good.

Vegetation condition

Three vegetation condition inspections have been conducted:

- In May 2022 Focused Vision Consulting conducted an initial assessment, assessing the condition as Very Good by the scale of Keighery (1994) (appendix 2)
- In September 2023 RPS conducted a qualitative assessment of the site and assessed the vegetation as in Degraded condition with patches of Good condition by the same scale
- The RIA, following its own inspection of the site, considers that the site is in Good condition with minor patches of Degraded condition (R. Gabbitus, *pers. comm* 2023).
- The relevant Keighery scale (1994) condition definitions are:Very Good: Vegetation structure (is) altered, obvious signs of disturbance. 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weed at high density, 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 and shrubs.

Focused Vision Consulting 2022

A review of the Focused Vision report shows that the condition assessment was based on a quadrat (Quadrat 11) placed just to the north of the site boundary, and a walk through of the western side. A total of 5 taxa were recorded in this quadrat, one of which is introduced (**Trachyandra divaricata*). The photo provided of Quadrat 11 (Focused Vision 2022) shows the same vegetation type as is shown in the RPS qualitative assessment report (Attachment B). The quadrat in relation to the proposed clearing area is shown in Figure 2.

While the vegetation retains some structure in the upper stratum (trees *Melaleuca lanceolata* and *Allocasuarina huegeliana,* and the shrub/tree *Acacia rostellifera*) the lower stratum is represented by two taxa, *Acanthocarpus preissii* and the weed **Trachyandra divaricata*. This shrub/herb layer can be interpreted as depauperate in that it lacks diversity as it is dominated by one native taxon, and includes the presence of an aggressive weed.

RPS 2023

The RPS qualitative assessment assessed the vegetation within the proposed clearing area as also depauperate in the shrub layer, similarly being dominated by the *Acanthocarpus preissii*. Occasional *Guichenotia ledifolia* and *Lysianthus calycinus* were noted, however, the introduced species **Trachyandra divaricata* was more common and widely distributed.

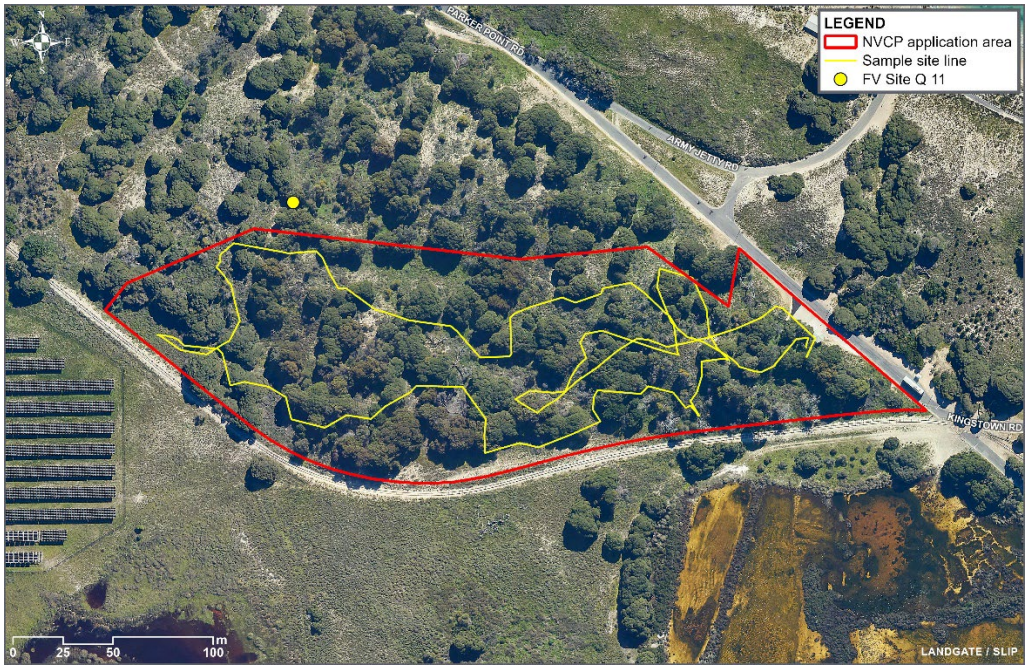

Figure 2 Location of Focused Vision 2022 quadrat 11 and RPS 2023 qualitative assessment tracks

Discussion

There have been multiple disturbances to the vegetation in the NVCP site:

- Historical photography (Plate 1) shows the area as cleared at the time (1981 – Plate 1);
- There is a railway line and associated buffer on the western and southern boundaries and a road on the eastern boundary; and
- Weed invasion particularly by **Trachyandra divaricata*, and deliberate introduction of non-endemic species.

Further:

- *Guichenotia ledifolia* is noticeably absent from the majority of the site, while it forms dense stands in other parts of the Island;
- Poole *et al* (2014) notes that intensive browsing by the Quokka has substantially impaired revegetation on Rottnest, and as *Acanthocarpus preissii* is not shown to be a preferred food plant it can be inferred that the taxon has benefitted from the selective grazing pressure reducing competition for space. As a food plant for Quokka, **Trachyandra divaricata* was recorded in 68.7% of faecal samples (second only to *Guichenotia ledifolia* at 77.6%) as opposed to 0% for *Acanthocarpus preissii* (Poole *et al*, 2014); and
- Phillips (2016) found that the density of Quokkas was significantly higher around the Settlement areas and this was correlated with tourism, escalating to its highest point around summer. It could be argued that this density is a man-made phenomenon and that overgrazing of palatable species (e.g. *Guichenotia ledifolia*) in the Settlement area or nearby is a result of human influence. DBCA Quokka monitoring in 2022, at a higher survey effort than Phillips (2016), recorded a higher quokka density in woodland (6/ha) compared to Phillips in 2016 (3.44/ha), with the highest density recorded around grassed areas within the Settlement (R. Gabbitus, *pers comm*). While the proposed clearing area is not within the Settlement area containing infrastructure and frequented by tourists, it is still closer to the areas of greater concentration.

Plate 1 1981 aerial photograph showing site almost entirely cleared (Photo courtesy of RIA)

RPS considers these disturbances to constitute a severe impact to the vegetation and its structure and therefore concludes that the vegetation to be in a Degraded condition over the majority of the proposed clearing area.

One small area at the eastern end of the proposed clearing area was assessed as 'Completely Degraded'. This area appears to have been established as an interpretive site for the Noongar seasons and various bush foods and other useful plants, with a gazebo and boardwalk in a fenced area. Currently, despite the upper stratum cover of *Melaleuca lanceolata*, there is little growing inside the fenced area except **Trachyandra divaricata*. The area can be said to be 'Parkland Cleared'.

Conservation significant flora

No conservation significant flora species listed under the EPBC Act or BC Act were identified within the site. However, one species recorded by Focused Vision (2022) had previously not been recorded on Rottnest Island.

Allocasuarina huegeliana is a tree 4-10 m high that is associated with granite (Western Australian Herbarium 1998-), although there is one record in the Western Australian Herbarium (PERTH 04864425) that was associated with the Tuart (*Eucalyptus gomphocephala*) which is known to grow on limestone.

This species was recorded at one site, quadrat 11. It has no conservation ranking, however, may be considered significant under the EPA Factor Guidelines (Environmental Protection Authority, 2016a) for local endemism.

Fauna

A desktop review of NatureMap and Protected Matters Search Tool results was used to identify significant fauna values by 360 Environmental (2022). Marine, wetland dependent and migratory species, identified in the desktop review but which require specific habitat not recorded in the study area, were excluded leaving a total of eight taxa potentially occurring (Table 2). Table 3 explains the conservation codes used in Table 2.

Table 3 Potential conservation significant fauna

Taxon	Common name	Status (BC Act)	Status (EPBC Act)
	Birds		
Zanda latirostis	Carnaby's Black-Cockatoo	EN	EN

Falco peregrinus	Peregrine Falcon	OS	
	Invertebrates		
Hesperocolletes douglasii	Douglas' Broad-headed Bee; Rottnest Bee	CR	CR
Idiosoma sigillatum	Swan Coastal Plain shield-backed trapdoor spider		
	Mammals		
Setonix brachyurus	Quokka	VU	VU
	Reptiles		
Lerista lineata	Perth slider; Lined skink	P3	
Pseudonaja affinis exilis	Rottnest Island dugite	P4	
Tiliqua rugosa konowi	Rottnest Island bobtail; Rottnest Island shingleback	VU	

Table 4 Conservation codes

Conservation code	Description
CR – Critically Endangered	Taxa facing an extremely high risk of extinction in the wild in the immediate future
EN - Endangered	Taxa facing a very high risk of extinction in the wild in the near future
VU – Vulnerable	Taxa facing a high risk of extinction in the wild in the medium-term
OS – Specially Protected	Species otherwise in need of special protection. Listed by order of the Minister as specially protected under section 13(1) of the BC Act.
P3 – Priority 3	Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat.
P4 – Priority 4	(a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy

The conservation significant taxa in Table 1 are discussed and their likelihood of occurrence (360 Environmental, 2022) are presented below.

Carnaby's Black Cockatoo

Listed as Endangered under both state and federal legislation. The species has been recorded on Rottnest Island (Cale, 2003), however, the Island does not provide foraging or roosting habitat. The species may be a rare visitor, however, the proposed clearing area does not provide significant habitat trees or suitable foraging and it is unlikely that it would occur.

Peregrine Falcon

The Peregrine Falcon is a wide ranging species across Australia. It typically nests on cliff ledges or refurbished nests built by other raptors. No suitable nesting habitat is available within the site and they are not expected to be seen on the Island (Birds Australia, 2010), however, occasional visitors may use the area for hunting.

Douglas' Broad-headed Bee

Previously listed as 'Presumed Extinct', due to changes in Rottnest Island vegetation since a 1938 collection, a single specimen was more recently collected in Banksia Woodland at Muchea and the species was reassessed as Critically Endangered. It is unlikely that the Bee is extant on Rottnest Island.

Swan Coastal Plain shield-backed trapdoor spider

This species occurs from Dalyellup in the south to Gingin in the north and east to the Darling Scarp, and includes Rottnest and Garden Islands. It is unlikely to occupy its full range due to urbanisation and habitat loss.

Burrows usually occur in Banksia woodland and heathland on sandy soils. As the proposed clearing area is on sandy soil this species may occur on the site.

Quokka

Rottnest Island supports the largest known population of this mammal. Rottnest Island staff, and the RPS botanist who walked over the site, observed Quokka scats within the site and it is likely that suitable habitat for this species is present within the site. Poole *et al* (2014) report that the highest number of rest site observations for the Quokka (34%) occurred in *Acanthocarpus preissii*, which dominates the ground stratum of the site.

Rottnest Island dugite

Dugites live in abandoned burrows or hollow logs and prefer coastal habitat, limestone heath, woodland and the Settlement area of the Island. Dugites are likely to utilise the proposed clearing area.

Perth Slider, Lined skink

A small burrowing skink, the Perth slider is found predominantly on the Swan Coastal Plain, and has been observed on Rottnest Island. The species was recorded in 1986, and a survey conducted between 2002-07 failed to record the species (Maryan *et.al.* 2015). The most recent observations were in 2015 (Maryan & Gaikhorst 2017) in *Acacia rostellifera* scrub, but it is not stated that this is its preferred habitat. As *Acacia rostellifera* was noted in the proposed clearing area, it is possible that this species utilises the area.

Rottnest Island bobtail

Bobtails prefer limestone heath, woodland and coastal habitats and are likely to use the vegetation within the proposed clearing area as habitat.

Conservation features

Rottnest Island is declared as a Class A Nature Reserve under the *Permanent Reserve Act 1899*.

Portions of the site are mapped as Environmental Sensitive Areas (ESA; Figure 3). The ESA on the southern boundary is the Bickley Swamp ESA. The north-western section of the proposed clearing area is mapped as the TEC (see Conservation significant vegetation above), and the existing vegetation is analogous to the TEC.

Under section 51B of the EP Act, exemptions for clearing native vegetation do not apply in ESAs.

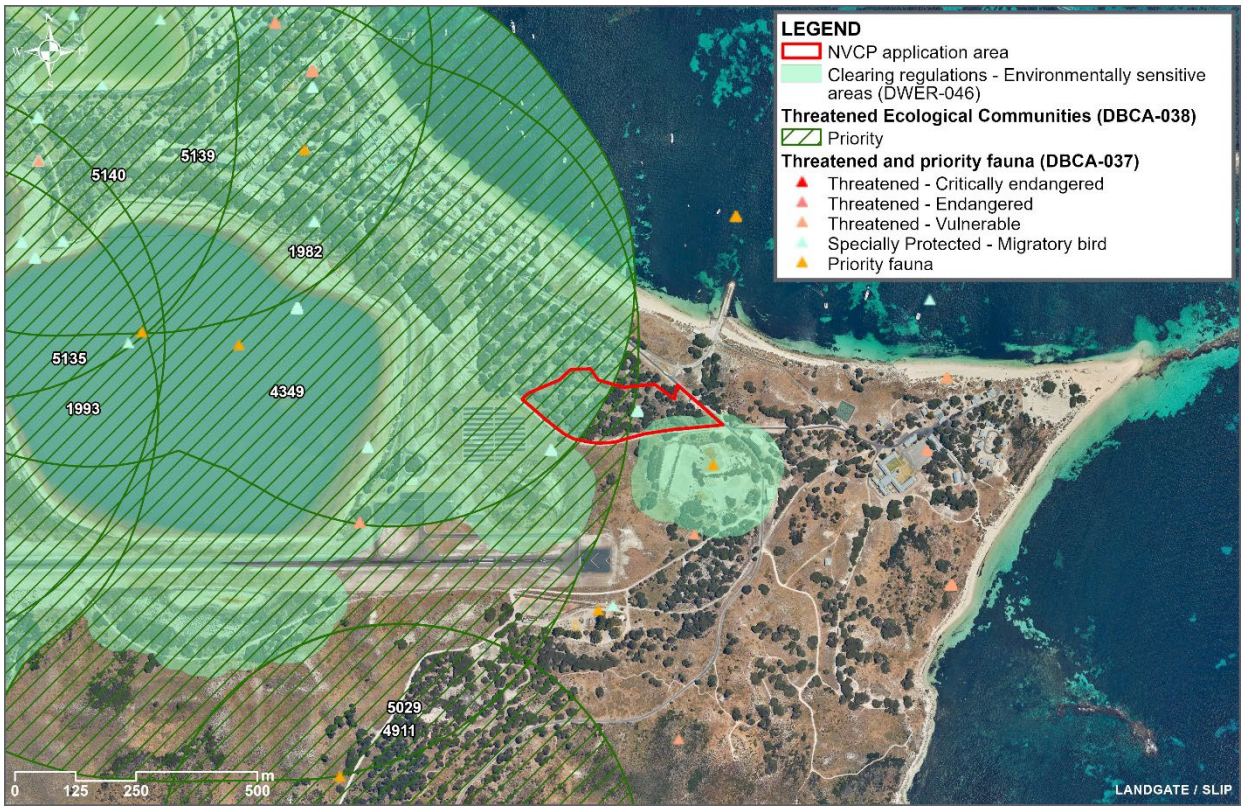

Figure 3 Environmentally Sensitive Areas

Heritage

The site is adjacent to a cultural site PP22-A-01 and its buffer zone to the north. This site will not be impacted either directly or indirectly by the proposed clearing.

A search of the DPLH Aboriginal Heritage Enquiry System did not identify any Aboriginal Cultural Heritage (Directory or Pending) mapped across the site. Historically, Rottnest Island was listed as Place ID 20862 (Rottnest Island (Wadjemup)).

Assessment against the 10 clearing principles

Table 3 provides and assessment of the proposed clearing against the 10 clearing principles as outlined in Schedule 5 of the *Environmental Protection Act, 1986* to determine whether the proposed clearing is at variance to the principles.

Table 5 Assessment of the proposed clearing against the 10 clearing principles

Principle	Assessment	Outcome
Principle (a) – native vegetation should not be cleared if it comprises a high level of biological diversity	A qualitative assessment of the site by RPS Lead Botanist Martin Henson (Attachment B) assessed the vegetation as in Degraded to Completely Degraded condition by the scale of Keighery (1994). The vegetation in the lower stratum is dominated by the Prickle Lily, *Acanthocarpus preissii* and the introduced Dune Onion Weed **Trachyandra divaricata*. Occasional individuals of *Guichenotia ledifolia* and *Lysiandra calycina* were also observed. Poole *et al* (2014) observe that the *A. preissii* is not a favoured food plant for the Quokka, being recorded in 0% of faecal samples analysed. They also report the 77.6% of faecal samples analysed contained fragments of *Guichenotia*	Clearing of vegetation at this site is not at variance with this Principle

	ledifolia, the highest percentage recorded, indicating it as a favoured food plant. It is suggested that selective grazing pressure by the Quokka has removed palatable species from the vegetation and allowed the increased growth of *A. preissii* due to decreased competition, resulting in a reduced diversity in the vegetation and allowing the ingress of weeds such as the **Trachyandra divaricata*. The site is therefore depauperate in the lower shrub stratum and is heavily infested with weeds such as **Trachyandra divaricata*. *Eucalyptus utilis* has also been planted through the area, and while it favours coastal habitat this species is not endemic to the island. The botanical biodiversity of the site has been reduced by clearing, overgrazing by Quokkas, deliberate introduction of non-endemic species, and weed invasion. As such, based on the site visit undertaken by RPS, the site is not considered to comprise a high level of biological diversity.	
Principle (b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for, fauna indigenous to Western Australia	The flora and fauna assessment conducted by 360 Environmental (2022) recorded a total of 172 conservation significant fauna taxa, however an assessment of Likelihood of Occurrence identified only 4 likely to occur, and one as possible, as discussed below: • Quokka (*Setonix brachyurus*) (Vulnerable; EPBC Act and BC Act). The species maintains group territories that fluctuate with changes to shelter availability and foraging suitability. Quokkas were observed utilising the site during the RPS qualitative assessment • Rottnest Island dugite (*Pseudonaja affinis exilis*) (Priority 4). The dugite prefers coastal habitats, and is likely to use the site for hunting. The dugite has been observed at the site (R. Gabbitus, *pers comm*) • Rottnest Island bobtail (*Teliqua rugosa konowni*) (Vulnerable, BC Act). Prefers coastal habitats, likely uses the site for general habitat. The bobtail has been observed at the site (R. Gabbitus *pers comm*) • Perth Slider (*Lerista lineata*) (Priority 3). This species was last recorded on Rottnest in *Acacia rostellifera* scrub. As this flora taxon was observed in the proposed clearing area it is possible that it may occur in the proposed clearing area. The remaining conservation significant fauna species identified within the database searches are considered to have a low likelihood of occurrence within the site due to the lack of suitable habitat. Vegetation within the site is well represented on Rottnest Island. While it is in Good to Completely Degraded condition in the proposed clearing area, observations of conservation significant fauna have been made in the area and it can be assumed that it is used by other species including native birds. The clearing of 3.29 hectares is unlikely to have a significant impact on these species.	The clearing of vegetation at this site may be at variance with this Principle
Principle (c) Native vegetation should not be cleared if it includes or is necessary for the	No Threatened or priority flora were identified within the site during flora and vegetation surveys and the site visit	The proposal is not at variance with this Principle

continued existence of rare flora	undertaken by RPS. As such, the proposed vegetation clearing will not impact rare flora.	
Principle (d) – Native vegetation should not be cleared if it comprises the whole or part of, or is necessary for the maintenance of, a Threatened Ecological Community (TEC)	The vegetation is mapped as *Melaleuca/Acanthocarpus Woodland* (Focused Vision, 2022). This vegetation type is analogous to the state listed TEC "*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described by Gibson *et. al.* 1994)", which is listed as Critically Endangered under the BC Act. The northern part of the site is in the buffer zone for recorded examples of this TEC, the southernmost part isn't and the site itself is not recognised as an ESA for supporting a TEC. Approximately 627 ha (360 Environmental, 2022) of the TEC occurs on Rottnest and Garden Islands, and on the mainland the remaining occurrences extend from Trigg in the north to Woodman Point and along the Swan River at Mt Henry and Peppermint Grove (Pride, J, 2008).	As up to 3.29 ha of TEC will be cleared this proposal is at variance with this Principle
Principle (e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	Historical Landgate photography from 1955 shows the site as was historically partly cleared. Revegetation has been occurring since 1963 (360 Environmental, 2022), however natural regeneration is low due to grazing by Quokkas. Locally, the site is an example of remnant vegetation in an area that has been extensively cleared, and represents the TEC "*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described by Gibson *et. al.* 1994), albeit in degraded condition. This condition assessment may reduce the significance of the vegetation stand. The TEC is part of a broad vegetation type described in Shepherd *et al* (Government of Western Australia, 2019) as "Low forest. Cypress pine" (Vegetation Association 15), with associated taxa *Acacia rostellifera, Melaleuca lanceolata* and *Callitris preissii.* Over 79% of the pre-European extent of this vegetation type remains, with over 56% of the current extent in DBCA managed lands.	The proposal is unlikely to be at variance with this Principle
Principle (f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland	There are no wetlands within the site and vegetation present within the site does not reflect wetland characteristics and is more reflective of dune vegetation. However, Bickley Swamp is located less than 50 m downslope of the site's southern edge at the rail line, and the ESA boundary around this wetland intersects the boundary of the proposed clearing area. Government House Lake is approximately 350 m to the west, and an unnamed wetland lies approximately 80 m to the south-west. These three wetlands are all classified as Environmentally Sensitive Areas and listed under the Directory of Nationally Important Wetlands (DCCEEW, 2023).	The proposal is unlikely to be at variance with this Principle

	Due to the distance from the site, Government House Lake and the wetland to the south west are unlikely to be impacted by the proposed development. Bickley Swamp is separated from the site by the rail line, which will minimise potential direct impacts from vegetation clearing and construction activities. Potential indirect impacts to the wetland will be managed through implementation of a Construction Environmental Management Plan.	
Principle (g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	The substrate of the site is unconsolidated sand formed into a dune. Sandy soils are prone to wind erosion, however as the site is proposed to be developed it will not contribute to land degradation Implementation of a Construction Environmental Management Plan will ensure that the risk of erosion and the introduction of weed species is minimised and managed during clearing and construction activities. The increase in human activity in the area may cause degradation to the surrounding area from - increased erosion following construction - increased access to the surrounding bushland people using the buildings - the potential for increased litter	The proposal is not at variance with this Principle
Principle (h) – Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation areas	Land to the west and south of the site has previously been cleared (except for Bickley Swamp which is discussed earlier). The proposed clearing will fragment the contiguous vegetation extending along Parker Point Road and through Bickley Swamp, and to a certain extent remnant vegetation across Parker Point Road to the east around the Army Jetty. This will reduce the connectivity of the vegetation between the listed TEC and examples to the south and south-east. This impact cannot be avoided. Direct impacts will be managed by a Construction Management Plan.	The proposal may be at variance with this Principle
Principle (i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water	No surface water features are located within the site. Although no groundwater investigations have been conducted it is assumed that a shallow unconfined aquifer lies beneath the site and that regional groundwater flow is towards Thomson Bay (360 Environmental, 2022), although there may be some groundwater flow towards Bickley Swamp based on topography. Rainwater collected from new buildings at the site will be directed to soakwells installed for this purpose, where it will infiltrate. Given that the proposed change to the site would remove deep rooted vegetation and replace it with buildings and hardstand it is possible that there would be an increase in groundwater level and flow. The quality of the runoff may be reduced due to the different usage of the area but landscaping will use native plants that do not require fertilisation or irrigation, reducing the risk of an increase in nutrient levels.	The proposal is not at variance with this Principle

Principle (j) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause, or exacerbate, the incidence of flooding	Rottnest Island receives a mean rainfall of 564.6 mm per annum, with the local climate consisting of cool wet winters and warm dry summers. Maximum mean rainfall occurs in July, with 111.5 mm. Flooding is not an issue as the soil is sandy and porous, and given the small area subject to this proposal this is not likely to change.	The proposal is not at variance with this Principle

Proposed Offset

The Rottnest Island Authority will be guided by the Department of Water and Environmental Regulation on the matter of suitable offsets to the proposed clearing, based on the precedent created by CPS 9883-1.

Yours sincerely,
for RPS AAP Consulting Pty Ltd

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Attachments:

- Figure A & B showing the vegetation type and condition (reproduced from 360 Environmental, 2022)
- Attachment A: Flora and fauna assessment *Parker Point Road Rottnest: Native Vegetation Clearing Permit: Supporting Documentation* (360 Environmental, 2022)
- Attachment B: RPS memo report: *RPS Qualitative vegetation assessment memo report* (RPS, 2023)
- Appendix C: Application for a Clearing Permit (Purpose Permit)
- Shapefile data

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Appendix 1 - of RPS memo

360 environmental | Part of SLR

Parker Point Road Rottnest

Appendix 1 - Native Vegetation Clearing Permit: Supporting Documentation

Prepared for

Rottnest Island Authority

September 2022

people planet professional

Document Reference	Revision	Prepared by	Reviewed by	Admin Review	Submitted to Client	
					Copies	Date
5159AB_Rev0	Internal Draft	JM/SB	SB	-	-	29/07/2022
5159AB_Rev1	Client Draft	JM/SB	SB	LI	1 x electronic	29/07/2022
5159AB_Rev2	Client Draft	JM/SB	SB	LI	1 x electronic	12/08/2022
5159AB_Rev4	Client Draft	JM/SB	SB	LI	1 x electronic	01/09/2022
5159AB_Rev5	Client Draft	JM	SB	LI	1 x electronic	13/09/2022
5159AB_Rev6	Client Final	JM	SB	RH	1 x electronic	15/09/2022

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1 Introduction

1.1 Background

360 Environmental Pty Ltd, part of SLR Consulting (360 Environmental) was commissioned by Rottnest Island Authority (RIA) to prepare a Native Vegetation Clearing Permit (NVCP) application for clearing associated with the construction of Stage 2 staff housing on Windy Hill / Parker Point Road, Rottnest Island.

The NVCP application is to clear up to 4 ha within a 5.74 ha area of native vegetation as shown in Figure 1 ('the Clearing Area'). Vegetation clearing will be carefully considered during detailed design, individual trees will be kept where possible. A perspective view of the Clearing Area and surrounding land is shown in Plate 1 to demonstrate the character of the landscape.

Plate 1: Aerial photograph of the site with indicative clearing area outlined in red

1.2 Purpose of Clearing Permit Application

This NVCP supporting document presents the results of an assessment of the clearing aspects of the proposal against the ten clearing principles as outlined in the (then) Department of Environment Regulation (DER)'s *A guide to the assessment of applications to clear native vegetation* (2014) under Part V Division 2 of the EP Act. It identifies the potential environmental impacts associated with the proposal based on the best available data. This document and the accompanying NVCP Purpose Permit application will be submitted to the Department of Water and Environmental Regulation (DWER) for assessment.

1.3 Responsible Applicant

The Rottnest Island Authority is responsible for the implementation of the clearing described within this report. Correspondence relating to this NVCP application should be addressed to:

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2 Site Overview

2.1 Location

The application areas are located within the Settlement Zone of Thomson's Bay. Rottnest Island is situated within the Indian Ocean, 19km west of Fremantle in Western Australia (RIA 2014a).

Rottnest Island is located outside of the Perth Metropolitan Region as defined in Schedule 3 of the Planning and Development Act 2005 (RIA 2014a).

2.2 Climate

The closest Bureau of Meteorology (BoM) weather station with a complete dataset is Rottnest Island (009193), located approximately 3.6 km west of the Site (BoM 2022). The region has a Mediterranean climate with wet winters and dry summers. The minimum temperature for Rottnest Island ranges from 12.4˚C (July and August) to 19.5˚C (February) and the mean maximum temperature ranges from 17.8˚C (July) to 27.3˚C (February) (1983-2022) (Plate 2) (BoM 2022). The annual average rainfall is 567.7 mm (1983-2022) (BoM 2022).

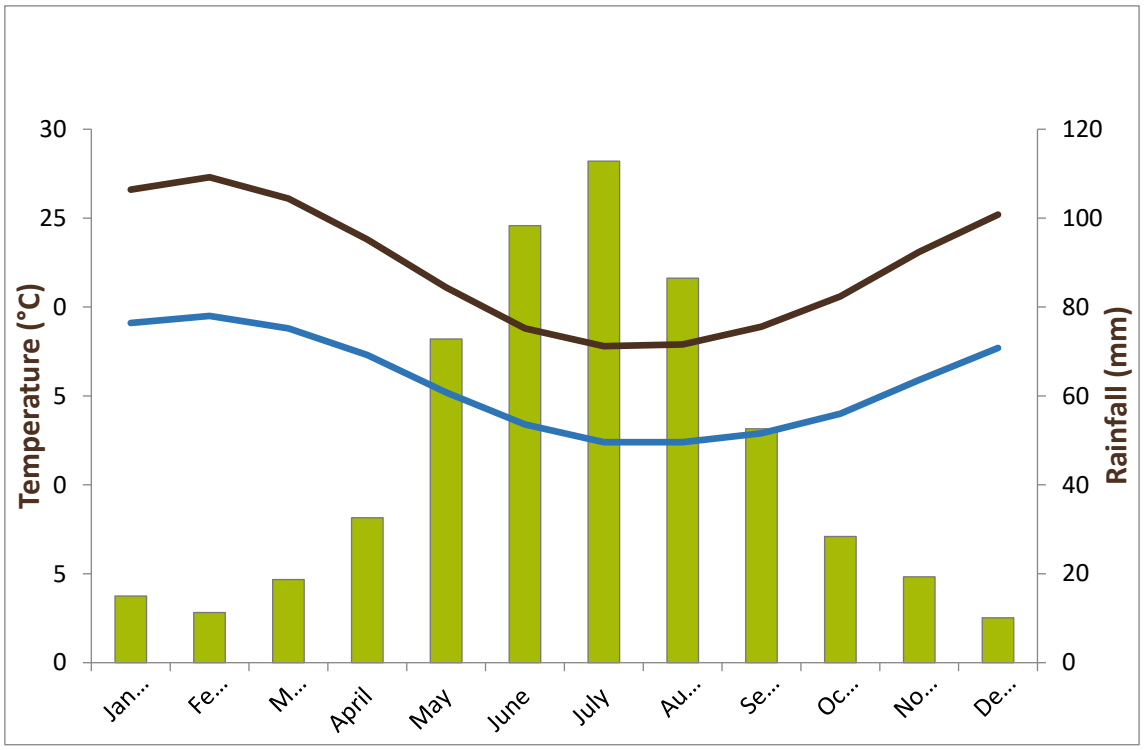

Plate 2: Rottnest Island Monthly Climate Data 1993-2022 (009193) (Bureau of Meteorology, 2022).

2.3 Topography

The topography of the site is relatively flat, and ranges from 7 m Australian Height Datum (AHD) in the southwest part of the site to 5 mAHD in the northeast (Google Earth, 2022).

2.4 Interim Biogeographic Regionalisation of Australia

The site is technically within the Swan Coastal Plain Bioregion and Perth subregion under the Interim Bioregionalisation of Australia (IBRA). The Swan Coastal Plain bioregion is a low lying coastal plain, mainly covered with woodlands (Mitchell, Williams, and Desmond, 2002). It is dominated by Banksia or Tuart on sandy soils, *Casuarina obesa* on outwash plains, and paperbark in swampy areas. In the east, the plain rises to duricrusted Mesozoic sediments dominated by Jarrah woodland. The outwash plains, once dominated by *Casuarina obesa-Marri* woodlands and Melaleuca shrublands, are extensive only in the south.

The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats, coastal limestone (Mitchell, Williams, and Desmond, 2002). The subregion is represented by heath and/or Tuart woodlands on limestone, Banksia, and Jarrah-Banksia woodlands on quaternary marine dunes of various ages, Marri on colluvial and alluvial.

2.5 Soil Landscape Systems

Soil landscapes and land system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, and has been captured at scales ranging from 1:20,000 to 1:250,000. Soil landscape mapping describes broad soil and landscape characteristics from regional to local scales. The site contains the following soil system:

- Quindalup South System: Coastal dunes, of the Swan Coastal Plain, with calcareous deep sands and yellow sands. Coastal scrub.

2.6 Hydrology and Wetlands

2.6.1 Surface Water

The site does not contain any surface water features. It is located approximately 100 m (at its closest point) northeast of the Government House Lake, which has an ESA associated with it (further discussed in Section 2.8) and is part of the Rottnest Island Lakes which are listed under the Directory of Nationally Important Wetlands (Figure 2).

2.6.2 Groundwater

Groundwater occurs in the Tamala Limestone forming a shallow, unconfined aquifer at Rottnest Island. The aquifer is recharged by rainfall to form a thin freshwater lens over saline groundwater with a mixing zone (RIA 2014). Salinity levels for the site are unknown; however, data from freshwater bores at the Wadjemup borefield approximately 3.5 km west of the site has recorded salinity levels ranging between 434 mg/L and 917 mg/L that fluctuate in response to groundwater abstraction and rainfall recharge (RIA 2014). The site is not within a Public Drinking Water Source Area (PDWSA). The nearest PDWSA is located approximately 3.1 km west of the site and refers to the Priority 3 Rottnest Island Water Reserve (DWER 2018a).

It is expected that a shallow unconfined aquifer will occur beneath the site and that groundwater flow will be in part toward Thomson's Bay and in part toward Government House Lake, to the southwest. Groundwater investigations would need to be conducted to determine localised groundwater flows; however, this information is not considered to be required for the NVCP.

2.7 Broad Vegetation Types

Vegetation mapping of the Swan Coastal Plain subregion of WA was completed on a broad scale (1: 250 000) by Beard (1972-80). These vegetation units were re-assessed by Shepherd et al. (2001) to account for clearing in the intensive land use zone, dividing some larger vegetation units into smaller units.

The site is wholly within one vegetation unit described below and the state, regional and local representation is presented in Table 1 (Shepherd et al. 2001):

- Rockingham 15: Low Forest. Acacia, Rottnest pine, coastal moort or mixed forest *Acacia rostellifera*, *Callistris preisii*, *Eucalyptus lehmannii*, *E. cornuta.*

Table 1: Broad Vegetation Types within the State, Regional and Local Representation (Government of Western Australia, 2019)

Vegetation Type	Pre-European Extent (ha)	Current Extent (ha)	Remaining (%)	Current Extent Managed in DBCA Lands (%)
Representation across Western Australia				
Rockingham_15	2,374.16	1,576.52	66.40	56.23
Representation across the Swan Coastal Plain Bioregion				
Rockingham_15	1,977.93	1,564.26	79.09	56.47
Representation across the Perth Subregion				
Rockingham_15	1,977.93	1,564.26	79.09	56.47
Representation across the City of Cockburn				
Rockingham_15	1,353.14	886.49	65.51	100.00

The EPA recommends that on the Swan Coastal Plain (SCP) vegetation complexes are maintained above the threshold level of 30% of the original pre-clearing extent of each community and 10% of the original pre-clearing extent of each community representation within the Perth Metropolitan Region. Rockingham_15 is above both thresholds (Table 1) (Government of Western Australia 2019).

2.8 Conservation Features

Environmentally Sensitive Areas (ESAs) are identified and protected under the Environmental Protection (Environmentally Sensitive Areas) Notice 2005. Under the Notice it is an offense to kill or destroy vegetation within an ESA without a NVCP. Under section 51B of the EP Act, exemptions for clearing native vegetation do not apply in ESAs.

A search of the Department of Water and Environment Regulation's (DWER) Clearing Permit System confirmed that the entire site is within an ESA (DWER 2018b). The ESA is associated with a Threatened Ecological Community (TEC) – *Callitris preissii* forests and woodlands, Swan Coastal Plain. Another ESA is identified which impacts the area is linked to Government House Lake located west of the site for its unique microbialites and utilisation by protected migratory birds (Figure 3).

2.9 Heritage

2.9.1 Aboriginal Heritage

Desktop review of the Aboriginal Heritage Inquiry System has identified that the site does not contain nor is it in proximity to a Registered Aboriginal Heritage Site. Investigation into the Indigenous Land Use Agreement identifies the site as within the Whadjuk people's traditional lands (DPLH 2018). The RIA will undertake an activity notice with South West Aboriginal Land and Sea Council (SWALSC), the outcome of which will advise if a site survey with Traditional Owners is required.

2.9.2 European Heritage

Desktop review of the State Heritage Office database did not identify any Registered Place within the site. However, there are two Registered Places in proximity of the site as described below.

The Settlement Zone of Thomson's Bay is listed as a Registered Place on the State Heritage Register (#00516) and is located approximately 205 m north of the site. The Thomson's Bay Settlement incorporates several cottages, the 'Quod', the sea wall fronting the Bay and the former Governor's Residence (now Hotel Rottnest) (SHO 2022). The site was constructed from 1840 to 1860. It is also understood that land to the southeast of the site has been used as a quarry for stone to construct buildings.

Kingstown Barracks is listed as a Registered Place on the State Heritage Register (#00525) and is located approximately 85 m east of the site. Kingstown Barracks contains army institutional buildings with a tower as the focal feature, hospital and the cottages, a jetty, a battalion camp site and gun battery with supporting communication and observation structures (SHO, 2022). The site was constructed in 1938.

3 Flora and Vegetation Assessment

RIA commissioned three flora and vegetation surveys over 2021 and 2022. Two by 360 Environmental and one by Focused Vision. The following summary and the assessment against the clearing principles is based on the more intensive work completed by 360 Environmental in 2022 (eight data collection points within the clearing area) augmented by the work completed by Focused Vision (two data collection points within the clearing area) to cover the full area (360 Environmental 2022; Focused Vision 2022) (Appendix A; Appendix B).

3.1 Desktop Assessment

The desktop study provided background information on the flora and vegetation of the site. Databases searches of the Commonwealth's Protected Matters Search Tool (PMST) with a buffer of 1 km and the State's NatureMap Search Tool with a buffer of 10 km were undertaken to compile a list of Threatened or Priority species or threatened or priority ecological communities (TECs or PECs) that may occur within the area (Appendix C and D).

3.1.1 Flora Assessment

Four (4) flora species of conservation significance were identified from the database searches (Table 2). Of the four listed flora species, two are listed as Priority 1 and one listed as Priority 4. One of the conservation significant flora species is listed as Vulnerable under the EPBC Act.

Table 2: Conservation Significant Flora Species

Scientific Name	Conservation Status
Diuris micrantha	VU
Lachnagrostis nesomytica subsp. *nesomytica*	P1
Lachnagrostis nesomytica subsp. *pseudofiliformis*	P1
Lepidium puberulum	P4

3.1.2 Vegetation Assessment

One threatened ecological community, *Banksia Woodlands of the Swan Coastal Plain*, was identified in the desktop search from the State's NatureMap Database as potentially occurring within or near to the site. However, 360 Environmental determined it was not present within the site as *Banksia* spp. was not recorded. It is understood that *Banksia* spp. does not occur anywhere on the island (Appendix A).

3.2 Flora and Vegetation Assessment

360 Environmental conducted a reconnaissance flora and vegetation survey of 3.85 ha in February 2022 (the Survey Area) which includes an extension beyond the area surveyed during the 2021 survey (Appendix A). The clearing area in relation to the mapped flora values as determined through Focus Vision (2022) are outlined in Figures 4 and 5. Results of 360 Environmental (2022), augmented by the work completed by Focused Vision to cover the full extent of the clearing area, are detailed below

3.2.1 Vegetation

3.2.1.1 Vegetation Condition

The vegetation of the Survey Area comprised remnant vegetation, native regrowth, planted natives and weed species. Vegetation condition within the Survey Area was identified by 360 Environmental as ranging from Good to Completely Degraded. The percentage of the vegetation within the Survey Area rated on the Keighery Vegetation Condition Scale are presented in Table 3. Focused Vision (2022) rated the vegetation condition slightly higher (Figure 4), however 360 Environmental's survey was a more intensive survey as more data collection points were completed, therefore its findings have been shown in in Table 3.

Table 3: Vegetation Condition (Keighery 1994)

Condition	Condition Description	Vegetation (%)
Pristine	Pristine or nearly so, no obvious signs of disturbance.	0
Excellent	Vegetation structure intact; disturbance affecting individual species; weeds are non-aggressive species.	0
Very Good	Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by very frequent fires; the presence of some more aggressive weeds; dieback; logging; grazing.	0
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; grazing.	49.75

Condition	Condition Description	Vegetation (%)
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 some very aggressive weeds; partial clearing; dieback; grazing.	41.18
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 flora comprising weed or crop species with isolated native trees or shrubs.	9.06

Disturbances within the Survey Area comprised weeds and historical clearing to facilitate access tracks and infrastructure. The understorey was heavily affected by weeds across the entire Survey Area.

3.2.1.2 Vegetation Types

Nine vegetation types were identified within the Focused Vision Survey Area.

The remaining portions of the Survey Area included planted vegetation and cleared areas.

The nine vegetation types are (Appendix A; Figure 5):

1. **MlAp**: *Melaleuca/Acanthocarpus* Woodland – *Melaleuca lanceolata* Tall Shrubland over *Acanthocarpos preissii* Low Open Shrubland
2. **ArAp**: *Acacia/Acanthocarpus* Shrubland – *Acacia rosteliffera* Tall Open Shrubland over *Acathocarpus preissii* Shrubland over *Trachyandara 9ivaricate* Low Sparse Forbland
3. **CpMl**: *Callitris/Melaleuca* Shrubland – *Callitris priessi* and *Melaleuca lanceolata* Tall Shrubland
4. **MlGl**: *Melaleuca/Guichenotia* Shrubland – *Melaeluca lanceolata* and *Callitris preissii* Tall Sparse Shrubland over *Guichenotia ledifolia*, *Acanthocarpus preissii* and *Rhagodia baccata* Shrubland over *Trachyandara divaricata* Low Sparse Forbland
5. **OaAp**: *Olearia/Acanthocarpus* Shrubland – *Olearia axillaris* Tall Sparse Shrubland over *Acanthocarpos preissii* Low Open Shrubland
6. **TiSS**: *Tecticornia* Samphire Shrubland – *Tecticornia indica* subsp. *bidens* Low Samphire Shrubland
7. **GtS**: *Gahnia* Sedgeland *Gahnia trifida* Tall Sedgeland

8. **LpAp**: *Lepidosperma/Acanthoca rpus* Sedgeland – *Acanthocarpos preissii*, *Rhagodia baccata* and *Conostylis candicans* Low Open Shrubland over *Lepidosperma gladiatum* Open Sedgeland over *Trachyandara 10ivaricate* Low Sparse Forbland
9. **SlG**: Spinifex Grassland – *Scaevola crassifolia* Low Open Shrubland over *Spinfex longifolius* Grassland.

3.2.1.3 Vegetation of Conservation Significance

The Banksia Woodlands of the Swan Coastal Plain ecological community identified by the database searches was not present within the Survey Area, as *Banksia* spp. was not recorded. It is understood that *Banksia* spp. does not occur anywhere on the island.

The State TEC SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain', is listed as Vulnerable and is restricted to the Quindalup Dune system, on which the Survey Area is located, and represented by forests and woodlands (Gibson et al., 1994). As of 2013, 627 ha of the TEC occurs between Trigg and Point Peron and around the Swan River in the Peppermint Grove Area as well as on Garden Island and Rottnest Island (DPAW 2014).

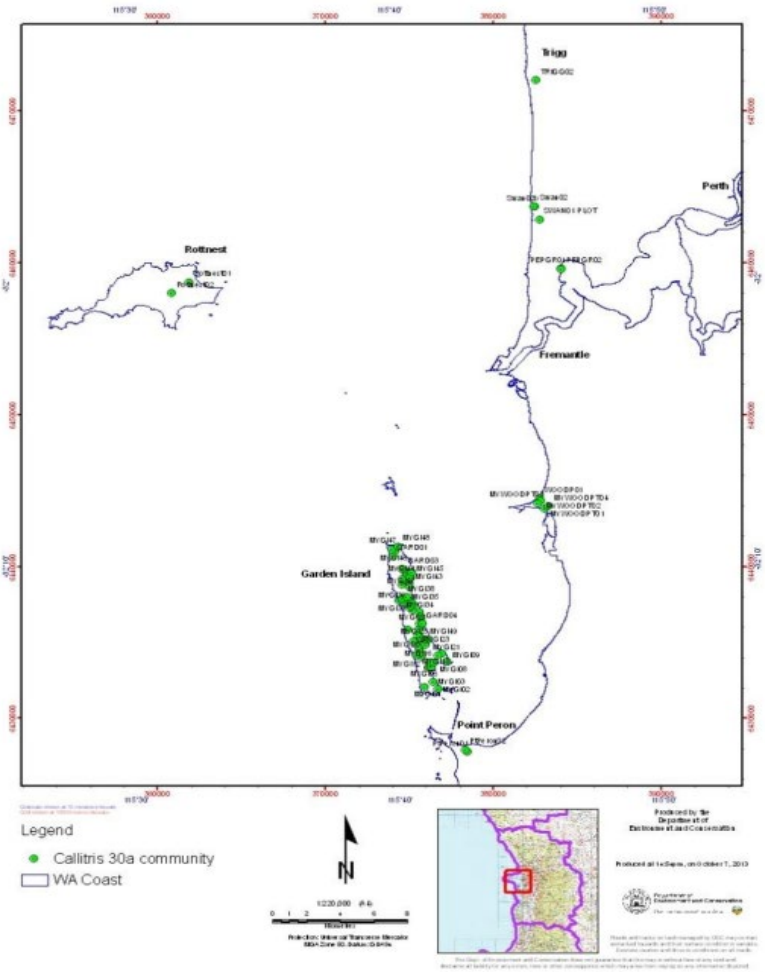

Plate 3: Occurrences of State TEC SCP30a (DPAW 2014)

Vegetation types described by 360 Environmental (2022), MlCpAp and MlAp, were represented by *C. preissii* (MlCpAp only) and *M. lanceolata*, which are the key taxa describing the SCP30a TEC, as well as the common community species *Acanthocarpus preissii*, and **Trachyandra divaricata*. For this reason, these vegetation types were considered analogous to the SCP30a TEC. Combined, these two vegetation types cover 2.38 ha (61.69%) of the Survey Area. It was noted that areas of these vegetation types continued outside of the Survey Area to the south and east which was confirmed by Focused Vision (2022) (Figure 5). The remaining vegetation types were not considered analogous to the TEC.

The separate surveys undertaken by 360 Environmental (June 2021) and Focused Vision (May 2022) identified the presence of the key taxon *C. preissii* within the survey area. Identifying the MlAp and CpMl mapped vegetation units as representative of the TEC (Figure 5).

The site was assessed as being mostly native vegetation, the remaining area being cleared. Historical records show that the native vegetation is natural regrowth (Plate 4). The RIA has no records of planting within the site.

3.2.1.4 Native Vegetation on Rottnest Island

Vegetation on Rottnest Island has been heavily modified since European settlement in the 1830s (RIA 2022). Large-scale clearing and the harvesting of timber occurred for the construction of buildings, railways, and roads, and for firewood. Frequency and intensity of fires increased, significantly impacting the fire sensitive *C. preissii* and *M. lanceolata*. The protection of the Quokka in 1917 led to rapid expansion of the population, resulting in impacts to vegetation through extensive grazing of seedlings. Currently, 4% of Rottnest Island is covered by naturally regenerated stands of TEC SCP30a. The RIA has undertaken revegetation since 2019 which has predominantly involved planting trees within fenced areas to exclude quokkas. Planned woodland management is further addressed in Section 5.2.

Plate 4: Clearing Area 1941 (left) and 2022 (right)

3.2.2 Flora

360 Environmental (2022) recorded a total of 24 taxa from 18 genera across 12 families. The dominant families were Poaceae and Myrtaceae (seven taxa each).

3.2.2.1 Threatened and Priority Flora

No Threatened flora taxa pursuant to the EPBC Act 1999 and/or gazetted as Threatened pursuant to the BC Act 2016 were recorded during the survey. No Priority flora taxa as listed by DBCA were recorded within the Survey Area.

It is noted that the timing of the survey was not suited to detecting the orchid *Diuris micrantha* but the likelihood of the species occurring in the project area is considered very low given that it is typically found in brown loamy clays within winter-wet swamps, neither of which occur on the site.

3.2.2.2 Weeds

Six introduced flora taxa were recorded within the Survey Area. None are listed as Declared Pests under the BAM Act (Department of Primary Industries and Regional Development 2022) or WoNS (Department of Agriculture Water and the Environment 2022b).

4 Fauna Assessment

A desktop review of NatureMap and Protected Matters Search Tool (PMST) results were used to identify the significant fauna values that may occur within the study area.

A total of 172 conservation significant fauna species were identified as potentially occurring within the study area in the desktop review (Table 4). These comprised:

- 59 birds
- Two (2) fish
- Two (2) invertebrates
- Ten (10) mammals
- Seven (7) reptiles
- Eight (8) sharks.

Most of the conservation significant fauna species identified in the database are migratory, marine or wetland dependent species that require specific habitats (open water or wetlands) for wading. The site does not contain these specific habitats but is within the vicinity of the shoreline part of the Rottnest Island Lakes. These species are therefore excluded from Table 4. A full list of species can be found in Appendix C and D. Fauna species that may utilise the site are listed in Table 3 below and a likelihood of occurrence assessment is described below.

Table 4: Conservation Significant Fauna Species

Species	Common Name	Conservation Status*	
		BC Act	EPBC Act
Birds			
Calyptorhynchus latirostris	Carnaby's Cockatoo	EN	EN
Falco peregrinus	Peregrine Falcon	OS	-
Invertebrates			
Hesperocolletes douglasi	Douglas' Broad-headed Bee, Rottnest Bee	CR	CR
Idiosoma sigillatum	Swan Coastal Plain shield-backed trapdoor spider	P3	-
Mammals			
Setonix brachyurus	Quokka	VU	VU
Reptiles			
Lerista lineata	Perth slider, lined skink	P3	-
Pseudonaja affinis exilis	Rottnest Island dugite	P4	-
Tiliqua rugosa konowi	Rottnest Island bobtail	VU	-

4.1 Birds

4.1.1 Waterbirds

Rottnest Island has been classified as an 'Important Bird Area' by BirdLife International, providing critical breeding habitat for many shorebirds. Waterbirds and waders have been identified as potentially occurring near the site, which are protected under International Agreements or under State and Federal legislation (Appendix C and D). Although these species may be present along the nearby shoreline, it is highly **unlikely** that they would utilise the site as it does not contain suitable breeding or foraging habitat for these species.

4.1.2 Carnaby's Black Cockatoo

Carnaby's Black Cockatoo is listed as Endangered under State and Federal legislation. The species has been identified on occasion at Rottnest Island; however, the Island does not provide primary foraging or feeding habitat. The species is usually found in southwest Australia along the Swan Coastal Plain some areas of the northern wheatbelt, generally in forest or woodlands (Cale 2003). In addition, Rottnest Island has not been identified as a primary habitat for the black cockatoo species and is located outside the species' habitat distribution area mapped by the Commonwealth (DAWE, 2016). The species may be a rare visitor however as the Clearing Area does not provide significant habitat trees or suitable foraging it is **unlikely** the species would occur.

4.1.3 Peregrine Falcon

The Peregrine Falcon is listed as 'Other Specially Protected Species' under State legislation. The species is an uncommon but wide-ranging bird across Australia (Barrett et al., 2003). It occurs mainly along rivers and ranges as well as wooded watercourses and lakes. It nests primarily on cliffs, granite outcrops and quarries, although is also known to occupy existing raptor and corvid stick nests (Menkhorst et al., 2017). The diet of the Peregrine Falcon has been well studied and primarily includes flocking species such as parrots and pigeons (Olsen and Fuentes, 2008). The Peregrine Falcon typically nests on cliff ledges or in refurbished nests built by other raptors or corvids (Pizzey and Knight, 2013). No appropriate nesting habitat is present within the site; however, the habitat **may** be used for hunting.

4.2 Invertebrates

4.2.1 Douglas' Broad-headed Bee

Douglas' Broad Headed Bee is listed as Critically Endangered under State and Federal legislation. The species was previously listed as 'presumed extinct' based on a specimen found in 1938 on Rottnest Island, the dramatic changes to the island vegetation since European settlement and despite extensive searched in the Perth Region (including Rottnest and Garden Islands) (DBCA 2018). In 2015, a single specimen was collected within the Banksia woodland in Muchea and on that basis has been reassessed and listed as Critically Endangered. Very little is known about the species including its floral preferences. However not all native flora has been eliminated on the island and it is **unlikely** that the bee is still extant on the island.

4.2.2 Swan Coastal Plain shield-backed trapdoor spider

The Swan Coastal Plain shield-backed trapdoor spider (*Idiosoma sigillatum*) is listed as Priority 3 under State legislation. *Idiosoma sigillatum* is the dominant idiopid trapdoor spider on the Swan Coastal Plan, where it occurs from Dalyellup north to at least Ledge Point (including Rottnest Island and Garden Island) with the eastern limit of its range along the sandy foothills of the Darling Escarpment, from Boyanup north to at least Gingin (WAM 2018b, Rix et al. 2018). Many of these records are historical in nature and occur within the Perth metropolitan area. It is highly likely that much of the habitat for this species within the Perth metropolitan area has been cleared for urban development and the species is unlikely to occur through much of its historical distribution in urban areas except in remnant habitats (e.g., Kings Park, Bold Park, and Shenton Park bushland) (Rix et al. 2018).

Burrows of this species usually occur in Banksia woodland and heathland on sandy soils and are adorned with a typical 'moustache-like' arrangement of twig-lines (Rix et al. 2018). Given that the Clearing Area contains heathland on sandy soils, the species **may** occur on the site.

4.3 Mammals

4.3.1 Quokka

The Quokka is listed as Vulnerable under both State and Federal legislation. Rottnest Island currently supports the largest population of the species. The species' population on Rottnest Island is noted as stable as they have been identified as resilient to current levels of disturbance (DEE 2022).

Rottnest Island Quokkas maintain group territories which fluctuate in area and location depending on time of year associated with changes in use related to shelter and availability of food. Diet primarily consists of succulents such a *Arthrocnemum halocnemoides*, *Carpobrotus aequilaterus* and *Rhagodia baccata* grasses and, to a much lesser extent, shrubs such as *Acacia rostellifera* and *Scaevola crassifolia*, and the sedge *Gahnia trifida* (DEE 2016). RIA staff have sighted Quokka scats at the site therefore Quokkas utilise the site.

4.4 Reptiles

4.4.1 Rottnest Island Dugite

The Rottnest Dugite is listed as Priority 4 under State legislation. The Rottnest Island Dugite is genetically different from the mainland population and is generally smaller than the mainland version. Dugites live in abandoned burrows or hollow logs and prefer coastal habitat, limestone heath, woodland, and the Settlement areas of the island (RIA undated). Dugites are **likely** to utilise the intact better-quality areas of native vegetation.

4.4.2 Perth Slider, lined skink

The Perth Slider is listed as Priority 3 under State legislation. The Perth Slider is a small burrowing skink, predominantly found on the Swan Coastal Plain. The species has rarely been observed on Rottnest Island and at one point was documented as 'possibly extinct' (Maryan et.al., 2015). However, in 2016 a targeted search was conducted and resulted in the species being recorded for the first time since 1986 (RIA 2022). The species was found in summer-scented wattle (*Acacia rostellifera*) scrub. The Perth Slider has a very fragmented distribution and has suffered significant habitat loss. *Acacia rostellifera* was not identified within the survey area during the 2022 Flora and Vegetation Survey and it is considered **may t**hat the species occurs within the clearing area.

4.4.3 Rottnest Island Bobtail

The Rottnest Island Bobtail is listed as Vulnerable under State legislation. Rottnest Island Bobtails, also known as Shinglebacks, are common around limestone rocks and prefer limestone heath, woodland, and coastal habitats, but also be found around the Settlement Area (RIA undated). Diet includes plant material (especially fruit), insects, slugs, snails, eggs, faeces, and dead animal carcasses including maggots. Bobtails are **likely** to use the vegetation within the clearing area as habitat.

5 Environmental Management Measures

5.1 General

Environmental management measures in place to minimise the risk of impact from the activities associated with the proposed clearing will include:

- Areas subject to erosion and sedimentation as a result of clearing shall be stabilised (i.e. combination of binding sprays, site mulch, bunding, scouring, catchment reduction as required).
- Adjacent areas of intact vegetation will be fenced to ensure no accidental impacts or clearing.
- Vegetation clearing will be scheduled to occur immediately before planned earthworks to minimise the potential for dust, where practicable.
- To ensure dieback is not introduced or spread on Rottnest Island, the movement of soils and plant material will follow RIA biosecurity policies and procedures.
- A pre-clearing fauna inspection will be performed immediately prior to clearing and identified fauna such as reptiles will be relocated to minimize impacts to fauna that may reside in the clearing area.
- The RIA will lodge an Activity Notice with South West Aboriginal Land and Sea Council (SWALSC). The Activity Notice determination will advise if a site survey with Traditional Owners is required.

5.2 Planned Woodland Management

Management of the *Callitris preissii* forests and woodlands threatened ecological community (TEC) is a key focus of the Rottnest Island Management Plan 2020-2024. The key strategy for this is the Woodland Experience Plan which is currently being drafted. Delivery of the plan will result in the enhancement and expansion of Woodland habitat on Rottnest Island and increasing opportunities for visitors and volunteers to engage and contribute to the conservation of the TEC. The key aims of the plan are to:

- Expand, enhance, and maintain the Woodland community on Rottnest Island to contribute to the conservation of the TEC, and the provision of fauna habitat
- Improve the natural recreation amenity of Rottnest Island, while providing unique woodland recreation opportunities for visitors.

The Woodland Experience will involve revegetation to expand Woodland on Rottnest Island. The RIA aims to revegetate 53 ha of altered heath by planting about 70,000 seedlings, installing 15,000 tree guards and building 14km of quokka-exclusion fencing. Existing and planned Woodland vegetation can be seen in Plate 5. Planting for conservation will be staged, with about 5,000 seedlings planted each year to ensure a variety of age groups are established. *C. preissii* and *M. lanceolata* will be planted together along with various other species depending on location across Rottnest Island with the aim to recreate and maintain connectivity of the woodland across the island.

Plate 5: Existing and planned Woodland vegetation on Rottnest Island (RIA 2022)

The Department of Biodiversity, Conservation and Attractions (DBCA) has prepared an interim recovery plan for the TEC. The aim of the recovery plan is to improve the overall condition of the community and to reduce the level of threat. The Woodland Experience will contribute to this recovery plan by maintaining and improving the extent and condition of the TEC on Rottnest Island.

6 Assessment Against the Ten Clearing Principles

The proposed clearing activities have been assessed against the ten clearing principles as defined in DER's Guide to Assessment: Clearing of Native Vegetation under the EP Act, considering the current extent and condition of the native vegetation on the site. This assessment is presented in Table 5.

Table 5: Assessment against the Ten Clearing Principles

Principle	Assessment
Principle (a) – Native vegetation should not be cleared if it comprises a high level of biological diversity	A desktop assessment of the PMST and NatureMap database identified one threatened flora taxon occurring within 10 km of the Clearing Area, *Diuris micrantha* (Vulnerable), however the clearing area does not have characteristics suitable for this species. 360 Environmental (2022) did not identify any Threatened flora species pursuant to the EPBC Act 1999 and/or gazetted as Threatened Flora pursuant to the BC Act 2016 within the Survey Area. Five introduced flora taxa were recorded during the survey. None of these are listed as Declared Pests under the BAM Act or WoNS Five vegetation types were mapped within the Survey Area. Two vegetation types were considered analogous to the State TEC SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain' ecological community. Vegetation condition ranged from good to completely degraded with disturbance comprising of weeds and historical clearing. Over half of the mapped area is considered to be in degraded or in completely degraded condition. **Assessed Outcome:** Based on this, the proposed clearing area does not comprise an area of vegetation with a high level of biological diversity and thus clearing is **not** at variance with this Principle.
Principle (b) – Native vegetation should not be cleared if it comprises the whole or a part of, or is necessary for the maintenance of a significant habitat for fauna indigenous to Western Australia	A desktop review of NatureMap and Protected Matters Search Tool (PMST) results were used to identify the significant fauna values that may occur within the study area. A total of 172 conservation significant fauna species were identified as potentially occurring within the study area in the desktop review (Table 3). A likelihood assessment identified that the Quokka (*Setonix brachyurus*) – Vulnerable, Rottnest Island dugite (*Pseudonaja affinis exilis*) – Priority 4 and Rottnest Island bobtail (*Tiliqua rugosa konowi*) – Vulnerable, were likely to occur and 167 species that may or are unlikely to occur. • Quokka: The species maintains group territories that fluctuate with changes in shelter and availability of food, data suggests quokka home ranges are <1ha. Sighted by Rottnest Island Authority staff, quokka are known to utilise the clearing. • Rottnest Island bobtail: The species are commonly found around limestone rocks and prefer limestone heath, woodland, and coastal habitats. Bobtails are likely to use the vegetation within the clearing area as habitat. • Rottnest Island dugite: The species prefer coastal habitat, limestone heath, woodland, and the Settlement areas of the island. Dugites are likely to utilise the clearing area as habitat.

Principle	Assessment
	The majority of species identified in the database searches are associated with the nearby coastline and inland lakes. Areas surrounding the site include intact vegetation and previously developed areas of the Settlement Zone which have been extensively cleared and urbanised, such as roads and dwellings for tourism, recreation, and accommodation. 360 Environmental (2022) rated vegetation within the Clearing Area as 'Good' or to 'Completely Degraded'. 'Good' vegetation is described by Keighery (1994) as 'vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it.' For the above mentioned fauna species, the disturbed nature of the vegetation, means that it is unlikely that the site would provide significant habitat for the above species. **Assessed Outcome**: Removal of up to 4 ha of vegetation is unlikely to have an impact on significant habitat for fauna, including conservation significant species. As such the proposed clearing is **unlikely** to be at variance with this Principle.
Principle (c) – Native vegetation should not be cleared if it includes or is necessary for the continued existence of rare flora.	360 Environmental conducted a reconnaissance flora and vegetation survey of the site in February 2022 (Appendix A). One Threatened flora taxon pursuant to the EPBC Act 1999 and/or gazetted as Threatened Flora pursuant to the BC Act 2016 was identified as occurring within 10 km of the Survey Area by database searches, *Diuris micrantha* (Vulnerable). *Diuris micrantha* grows on brown loamy clays, in swamps and shallow water (WA Herbarium 1998). The Clearing Area has a sandy soil type and does not occur within a swamp or shallow water therefore it is unlikely that the species occurs within the area. Furthermore, no Threatened flora taxa were recorded during the field survey. The database searches identified four Priority flora taxa as occurring within 10 km of the Survey Area. None were recorded within the Survey Area. **Assessed Outcome:** No Threatened flora species were found to occur or are considered likely to occur within the Clearing Area. Therefore, the proposed clearing is **not** at variance with.
Principle (d) – Native vegetation should not be cleared if it comprises the whole or a part of or is necessary for the maintenance of a Threatened Ecological Community (TEC).	A desktop assessment of the PMST and NatureMap database identified one TEC potentially occurring within 10km of the clearing area, Banksia Woodlands of the Swan Coastal Plain. *Banksia* spp. was not recorded during the survey, and it is understood that *Banksia* spp. does not occur anywhere on the island. Three vegetation types were identified by Focused Vision (2022) within the clearing area, two vegetation types CpMl and MlAp were represented by *C. preissii* (CpMl only) and *M. lanceolata*, which are the key taxa describing the SCP30a TEC, as well as the common community species *Acanthocarpus preissii*. For this reason, these vegetation types were considered analogous to the SCP30a TEC. A percentage of the clearing area contains both *C. preissii* and *M. lanceolata,* most of the clearing area contained only *M. lanceolata* as the key taxa for the TEC (Figure 5). The remaining vegetation within the clearing area was not analogous with the TEC. MlAp vegetation types continues outside of the clearing area.

Principle	Assessment
	The TEC will be directly impacted by the proposed clearing however management measures will include final development design that maximises tree and vegetation retention and manage the TEC outside the boundary of the clearing area. **Assessed Outcome**: The proposal will require up to 4 ha of TEC to be cleared therefore the proposed clearing **is** at variance with this Principle.
Principle (e) – Native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared	The National Objectives and Targets for Biodiversity Conservation 2001 – 2005 include a target to have clearing controls in place that prevent the clearance of ecological communities with a pre-European extent below 30% (Commonwealth of Australia 2001). Further the EPA recommends that on the Swan Coastal Plain (SCP) vegetation complexes are maintained above the threshold level of 30% of the original pre-clearing extent of each community and 10% of the original pre-clearing extent of each community representation within the Perth Metropolitan Region. The site contains one mapped vegetation complexes, Rockingham_15. Rockingham_15 is above both thresholds (Table 1) (Government of Western Australia 2018). Review of historical photographs has identified a large portion of the site and Rottnest Island has been extensively cleared and non-endemic vegetation planted by 1955. The site is within the Settlement zone which is the only area that has had extensive urbanisation. Revegetation has been occurring at Rottnest Island since 1963 however due to changes in fire regimes and intense grazing from Quokkas, natural regeneration of vegetation is low resulting in 4% of Rottnest being covered by naturally regenerated SCP30a TEC. Locally, the clearing of up to 4 ha of previously impacted vegetation within the Settlement zone may be significant as, despite it being a small amount of important native vegetation (4 ha out of approximately 76 ha of SCP30a TEC), on the island it exists within a highly fragmented, isolated landscape. **Assessed Outcome**: The vegetation is likely to be significant to Rottnest Island, however the remaining vegetation is above the threshold level of 30% of the original pre-clearing extent therefore the proposed clearing **may** to be at variance with this Principle.
Principle (f) – Native vegetation should not be cleared if it is growing in, or in association with, an environment associated with a watercourse or wetland.	The vegetation on the site is not growing in or in association with an environment associated with a watercourse or wetland. No surface water features are identified at the site. The site is located approximately 100 m north-east of Government Lake, which is part of the Rottnest Island Lakes listed under the Directory of Nationally Important Wetlands (DoE 2008). The site and Government Lake are separated by a road, an old railway, and some vegetation. The clearing at the site is not expected to impact this lake as there are no associated surface water features within the site. **Assessed Outcome:** The proposed clearing is **not** to be at variance with this Principle.

Principle	Assessment
Principle (g) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause appreciable land degradation	The DER (2014) defined land degradation as including the following: • The clearing of vegetation • Decline in vegetation condition (including spread of weeds) • Soil erosion and soil acidity (caused by wind and water erosion due to vegetation clearing) • Salinity • Waterlogging/flooding. The proposal includes the clearing of up to 4 ha. The vegetation condition within the Survey Area ranged from Good to Completely Degraded. A large portion of the Survey Area was assessed as being in Good (49.75%) condition with the remaining vegetation assessed as being in Degraded (41.18%) and Completely Degraded (9.06%) condition. The vegetation is near the urbanised Settlement zone. To reduce the risk of spread or introduction of Dieback (*Phytophthora cinnamomi*) at the site and Rottnest Island, procedures will be implemented to ensure that vehicles, equipment, and machinery will be clean and free of soil prior to being mobilised at the site. According to mapping of acid sulfate soils (DER 2014), the site is not within an area of recorded risk of ASS. Sandy soils are prone to wind erosion. The application area is characterised as having sandy soils, however, due to proposed urbanisation of the site, it is not likely that the removal of vegetation would cause significant soil erosion as the Project will involve increased sealed surface areas or landscaping that will minimise erosion risk. Groundwater salinity at the site is unknown, however, groundwater bores located approximately 3.5 km west of the site have salinity levels ranging between fresh and brackish. A typically thin freshwater aquifer exists over the saline aquifer. The topography of the site is relatively flat and slopes gently to the south. It is not expected that clearing would have cause significant water erosion. **Assessed Outcome**: The Proposal is **not** at variance with this Principle.

Principle	Assessment
Principle (h) – Native vegetation should not be cleared if the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area	The entire site is mapped within an Environmentally Sensitive Area ESA (DWER 2018b). The ESA is associated with a Threatened Ecological Community (TEC) – *Callitris preissii* forests and woodlands, Swan Coastal Plain (SCP30a) and Government House Lake located southwest of the site. State TEC SCP30a has been identified with the clearing area and extending outside the clearing area to the south and east. The patch of TEC is part of a fragmented mosaic of TEC. Management measures will include final development design that maximises tree and vegetation retention and manage the TEC outside the boundary of the clearing area. The ESA associated with the Conservation Category Wetland (CCW), Government House Lake, incorporates the wetland itself, the littoral vegetation and a 50m buffer. The site is separated by approximately 90m of mostly vegetated land and the road to the airport, at its closest point. This land acts as a buffer between the clearing footprint and the ESA; therefore, it is unlikely there will be impacts to the values of the CCW or the 50m buffer No other known conservation areas have been found within proximity of the site. The activities associated with the proposal is likely to only impact the vegetation within the clearing footprint. It is not likely that the clearing would have an impact on the conservation value of nearby conservation areas through the spread of weeds or dieback. However, Best Practice Management will be implemented to ensure the risk of spread of weeds or dieback is reduced during clearing works and operations. **Assessed Outcome**: The Proposal is **unlikely** to be at variance with this Principle.
Principle (i) – Native vegetation should not be cleared if the clearing of the vegetation is likely to cause deterioration in the quality of surface or underground water	The site is not mapped within a PDWSA. The nearest drinking water supply borefields are located at Wadjemup and Longreach Bay approximately 3.5 km west and 1.5 km northwest of the site. The nearest PDWSA is located approximately 1 km northwest of the Site and refers to the Priority 3 Rottnest Island Water Reserve (DoW 2016). No surface water features are present within the site, with the nearest water feature, Government House Lake, located approximately 100m south of the site. Government House Lake is part of the Rottnest Island Lakes listed under the Directory of Important Wetlands (DoE 2008). Although no groundwater investigations have been conducted it is assumed that a shallow unconfined aquifer lies beneath the site and that groundwater will flow in part toward Thomson's Bay and in part toward Government House Lake, to the southwest.

Principle	Assessment
	The site's groundwater quality is unknown; however, nearby groundwater bores located approximately 3.5 km west of the site have reported salinity levels ranging between 434 mg/L and 917 mg/L (RIA 2018c). The site is expected to have some groundwater salinity, however, the clearing of up to 4 ha of previously cleared vegetation is not considered to have a high risk of groundwater quality deterioration. It is not expected that the clearing up to 4 ha of vegetation would have a significant impact on groundwater or surface water quality. The site is within the urbanised 'Settlement Zone' of Rottnest Island that has been historically cleared as early as the 1930s and most of the clearing within the site was undertaken prior to 1995. **Assessed Outcome**: The Proposal is **unlikely** at variance with this Principle.
Principle (j) – Native vegetation should not be cleared if clearing the vegetation is likely to cause, or exacerbate, the incidence of flooding	The local climate consists of wet winters and dry summers (BoM 2018) with a mean maximum rainfall of 113.1 mm in June. Given the small application area, the removal of up to 4 ha of vegetation is not likely to cause or exacerbate the incidence or intensity of flooding. Removal of this vegetation is not likely to significantly change the characteristics of existing water flow. **Assessed Outcome:** The Proposal is **not** at variance with this Principle.

7 Summary of Assessment

The NVCP application is to clear up to 4 hectares (ha) with a 5.74 ha area of native vegetation. Vegetation clearing will be carefully considered during detailed design, individual trees will be kept where possible.

After desktop and field assessment of the environmental values of the clearing area it is concluded that the proposal to clear up to 4 ha of native vegetation is not significant. Conclusions were that the proposal is **not** at variance with Principles a, c, f, g and j, is **unlikely** to be at variance with Principles b, h, and I, **may** be at variance with Principle e, and **is** at variance with Principle d. Key conclusions are summarised below.

Principle (a) states that native vegetation should not be cleared if it compromises a high level of biological diversity. No threatened flora was identified as likely to occur within the clearing area nor did vegetation surveys identify any threatened flora species. Five vegetation types were mapped within the survey area, two were considered analogous to the State TEC SCP30a '*Callitris preissii* (or Melaleuca lanceolata) forests and woodlands, Swan Coastal Plain' ecological community. Much of the proposed clearing area is highly disturbed. It contains vegetation that ranges from Good (49.75%) to degraded/ completely degraded (50.25%). Consequently, the removal of up to 4 ha of native vegetation is not considered to represent a significant loss of biodiversity.

Principle (d) states that native vegetation should not be cleared if it comprises the whole, a part of, or is necessary for the maintenance of a TEC. The proposal will include the clearing of 4 ha of vegetation analogous with the TEC that varies in condition from good to completely degraded. Although the proposal may be at variance with this principle, it is not considered that the clearing of up to 4 ha of TEC would have a significant impact on the maintenance of a TEC in a regional context. It is concluded that the Proposal is at variance with Principle (d).

Principle (e) describes that native vegetation should not be cleared if it is significant as a remnant of native vegetation in an area that has been extensively cleared. It is considered that the vegetation is likely to be significant to Rottnest Island, however the remaining vegetation is above the threshold level of 30% of the original pre-clearing extent for the community. We conclude that the proposed clearing may be at variance with this Principle.

8 Limitations

This report is produced strictly in accordance with the scope of services set out in the contract or otherwise agreed in accordance with the contract. 360 Environmental makes no representations or warranties in relation to the nature and quality of soil and water other than the visual observation and analytical data in this report.

In the preparation of this report, 360 Environmental has relied upon documents, information, data, and analyses ('client's information') provided by the client and other individuals and entities. In most cases where client's information has been relied upon, such reliance has been indicated in this report. Unless expressly set out in this report, 360 Environmental has not verified that the client's information is accurate, exhaustive, or current and the validity and accuracy of any aspect of the report including, or based upon, any part of the client's information is contingent upon the accuracy, exhaustiveness, and currency of the client's information. 360 Environmental shall not be liable to the client or any other person in connection with any invalid or inaccurate aspect of this report where that invalidity or inaccuracy arose because the client's information was not accurate, exhaustive, and current or arose because of any information or condition that was concealed, withheld, misrepresented, or otherwise not fully disclosed or available to 360 Environmental.

Aspects of this report, including the opinions, conclusions, and recommendations it contains, are based on the results of the investigation, sampling and testing set out in the contract and otherwise in accordance with normal practices and standards. The investigation, sampling and testing are designed to produce results that represent a reasonable interpretation of the general conditions of the site that is the subject of this report. However, due to the characteristics of the site, including natural variations in site conditions, the results of the investigation, sampling and testing may not accurately represent the actual state of the whole site at all points.

It is important to recognise that site conditions, including the extent and concentration of contaminants, can change with time. This is particularly relevant if this report, including the data, opinions, conclusions, and recommendations it contains, are to be used a considerable time after it was prepared. In these circumstances, further investigation of the site may be necessary.

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Figures

Legend

Clearing area

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2020
- OTHER DATA SOURCED LANDGATE 2020
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2020
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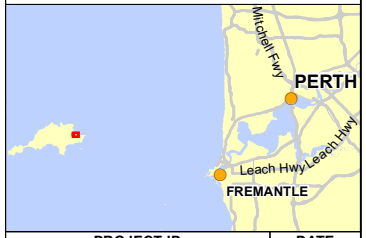
LOCALITY MAP



PROJECT ID	DATE
4012	26-Jul-2022

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
AN	AN	JM	0

Rottnest Island Authority
Windy Hill, Rottnest Island

Windy Hill NVCP Stage 2

Figure 1
Clearing Footprint

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Legend

- Clearing area
- Lake
- Swamp
- Coastal Waterline

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2020
- OTHER DATA SOURCED LANDGATE 2020
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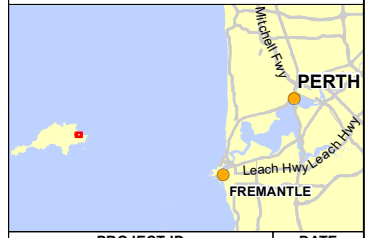
LOCALITY MAP



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CREATED	CHECKED	APPROVED	REVISION
AN	AN	JM	0

Rottnest Island Authority
Windy Hill, Rottnest Island

Windy Hill NVCP Stage 2

Figure 2
Surface Water Features

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115°32'20" 115°32'25" 115°32'30" 115°32'35" 115°32'40" 115°32'45" 115°32'50" 115°32'55" 115°33'

361900 362000 362100 362200 362300 362400 362500 362600 362700 362800 362900 363000

-32° -32°0'5" -32°0'10"

6458700 6458600 6458500 6458400 6458300 6458200

Grid shown at 100 metre intervals Graticule shown at 5 seconds intervals Aerial Photo: September 2021 (Landgate)

Document Path: M:\GIS\Projects\Heritage\Activity Notice\Map Documents\Parker Point Staff Housing\Parker Point Road (Windy Hill South) Staff Housing - TEC.aprx

Figure 3: Environmentally Sensitive Areas and Threatened Ecological Communities

- Clearing Area
- Threatened Ecological Communities (Gazetted Vulnerable Category Only) - Unbuffered
- Clearing Regulations - Environmentally Sensitive Areas (DWER-046)

N

1:3,000 (A3)

0 100 200 300

Metres

Projection: Universal Transverse Mercator.
MGA Zone 50. Datum: GDA94

Produced by: david.robertson, Rottnest Island Authority

Date Saved: 9/1/2022 11:17 AM

ROTTNEST IS

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Legend

- Clearing area

Vegetation Condition

- Very Good
- Good-Very Good
- Good
- Degraded-Good
- Degraded
- Degraded-Completely
- Degraded-Completly Degraded
- Cleared

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2020
- OTHER DATA SOURCED LANDGATE 2020
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2020 (© Western Australian Land Information Authority 2020)

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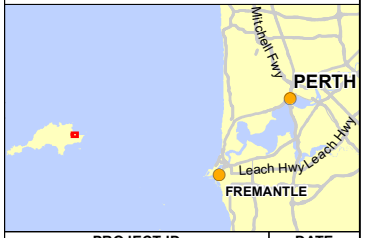
0 25 50 75 Metres

1:3,000 @ A4

N

LOCALITY MAP



PROJECT ID	DATE
4012	26-Jul-2022

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
AN	AN	JM	0

Rottnest Island Authority
Windy Hill, Rottnest Island

Windy Hill NVCP Stage 2

Figure 4
Vegetation Condition

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K:\Projects\9.0 APP\5149 Windy Hill Rottnest Island NVCP\5149 F04 Vegetation Condition.mxd

Legend

- Clearing area
- Vegetation Analogous to TEC

Vegetation Types

- Beach
- Cleared
- CpMl
- MlAp
- MlGl
- OaAp
- Planted
- SIG
- TiSS

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2020
- OTHER DATA SOURCED LANDGATE 2020
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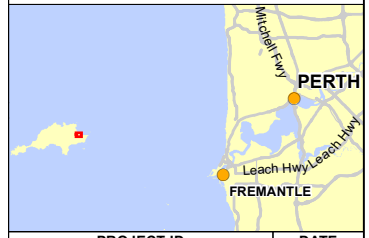
LOCALITY MAP



PROJECT ID	DATE
4012	26-Jul-2022

HORIZONTAL DATUM AND PROJECTION
GDA 1994 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
AN	AN	JM	0

Rottnest Island Authority
Windy Hill, Rottnest Island

Windy Hill NVCP Stage 2

Figure 5
Vegetation Types and TEC

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Appendices

Appendix A
360 Environmental – Reconnaissance Flora and Vegetation Survey (April 2022)

Our Ref: 5185AA_Rev1

05 April 2022

Mark Jones
Development Planning Coordinator
Rottnest Island Authority
ROTTNEST ISLAND WA 6161
Via Email: mark.jones@dbca.wa.gov.au

Dear Mark

Windy Hill TEC Assessment

1 Introduction

Rottnest Island Authority (RIA) commissioned 360 Environmental Pty Ltd part of SLR Consulting (360 Environmental) to undertake a flora and vegetation assessment with a focus on conservation significant communities in Windy Hill within the main Rottnest Island settlement (the Survey Area) on 17 February 2022 (Figure 1). In June 2021, 360 Environmental surveyed an area overlapping the Survey Area (the June 2021 Survey Area), and the results from the survey have helped to inform the current survey.

The reconnaissance survey was undertaken in accordance with EPA technical guidelines (Environmental Protection Authority, 2016), to understand key flora and vegetation values within the Survey Area. The focus of the survey was to delineate any identified instances of the State Threatened Ecological Community (TEC) SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain', which is listed as Vulnerable.

This brief letter report outlines the key findings from the survey with management mitigation measures, if required.

2 Scope of Works

The scope of works included provision of:

- A desktop assessment using relevant database searches and a literature review of the previous survey results to compile and summarise existing records of flora, vegetation, and fauna (including conservation significant species and communities) in the vicinity of the Survey Area
- A reconnaissance flora and vegetation survey using detailed mapping notes to identify and describe the vegetation and flora occurring within the Survey Area
- A brief letter report outlining key findings and proposed management actions
- A geospatial data package prepared in accordance with IBSA requirements.

3 Methodology

3.1 Desktop Assessment

3.1.1 Literature Review

Background information on the Survey Area and surrounds was compiled prior to the field survey referencing previous surveys completed in the vicinity of the Survey Area (see Section 4.2.2):

- Rottnest Island Survey (360 Environmental Pty Ltd, 2020), located less than 1.0 km northwest of the Survey Area
- Windy Hill Staff Accommodation Project - Assessment Report (360 Environmental Pty Ltd, 2021), which overlaps the current Survey Area.

3.1.2 Database Searches

Database searches were conducted in the vicinity of the Survey Area:

- A NatureMap (Department of Biodiversity Conservation and Attractions, 2020a) database search (10 km buffer) was undertaken in November 2020 to obtain a list of potential flora species occurring within the Survey Area, including conservation significant flora taxa (Appendix A)
- An EPBC Protected Matters Search (PMST) was undertaken in March 2022 to identify the potential for Matters of National Environmental Significance (MNES) to occur within or surrounding the Survey Area (Department of Agriculture Water and the Environment,2022a) (Appendix B).

3.2 Flora and Vegetation

3.2.1 Field Survey

The reconnaissance flora and vegetation survey was undertaken on 17th February 2022 by Senior Botanist Simon Colwill who has over 10 years of experience conducting surveys of similar scope throughout Western Australia. The Survey Area was predominantly restricted to existing cleared and heavily impacted areas, or highly restricted sections of native vegetation. Any vegetation outside the Survey Area was only assessed in reference to targeting undescribed or conservation significant flora. All data was collected using a Fulcrum mobile data collection device.

3.2.2 Establishment of Flora Sites

The Survey Area was assessed via detailed mapping notes and meandering traverses to gather information to characterise and delineate vegetation and compile an inventory of vascular flora. At each site, detailed mapping notes were undertaken with the following information collected:

- Site photograph
- Location – GPS Coordinates
- Landform and soil description
- Species list – including heights and foliar cover
- Vegetation Description – in accordance with the National Vegetation Information System (NVIS) Level 5
- Vegetation Condition.

A total of eight detailed mapping notes were completed during the survey. Where an instance of the conservation significant community was encountered, a mapping note was taken and a small search to delineate community boundaries was undertaken.

3.2.3 Taxonomy and Nomenclature

Where field identification of plant taxa was not possible, specimens were collected for identification using resources of the WAH. Identification of flora collections was completed by Principal Botanist Narelle Whittington.

The finalised species list was checked against FloraBase (Western Australian Herbarium, 2022) to determine the conservation status and known distribution of each taxon. Introduced species were compared against the current Biosecurity and Agriculture Management (BAM) Act Declared Plants list and the Weeds of National Significance (WoNS) list to determine their control status (Department of Agriculture Water and the Environment, 2022b; Department of Primary Industries and Regional Development, 2022).

4 Results

4.1 Limitations

Limitations and constraints of the flora, vegetation and fauna survey are detailed below in Table 1.

Table 1: Limitations and Constraints Associated with the Survey Area

Variable	Degree of Limitation (Yes/Partial/No)	Potential Constraints on Survey Outcomes
Survey Scope	No	The reconnaissance flora and vegetation survey was undertaken in accordance with EPA guidelines (Environmental Protection Authority, 2016) and was considered appropriate to support approvals applications. The Survey Area was assessed via detailed mapping notes and meandering traverses to gather information to characterise and delineate vegetation and compile an inventory of vascular flora The entire Survey Area was not systematically searched, and therefore additional flora taxa, and records of significant flora and weed species may be recorded with additional survey effort. However, this was not considered a limitation due to the dry condition of the Survey Area and the below-average rainfall recorded for the three months prior to commencing the survey.
Availability of Data	No	All data required to complete the scope of works including regional and local contextual information was available.
Site Access	No	The Survey Area was able to be accessed on foot.
Survey Intensity and Resources	No	Eight mapping notes were undertaken to aid vegetation mapping and delineation, as well as preparing an inventory of vascular flora for the Survey Area. The entire Survey Area was not systematically searched, and therefore additional flora taxa, and records of significant flora and weed species may be recorded with additional survey effort. The survey effort was considered adequate to assess the flora and vegetation values of the Survey Area and provide information required to support approvals applications.
Experience	No	Senior Botanist Simon Colwill undertook the detailed flora and vegetation survey. Simon has over 10 years' experience conducting surveys of similar scope throughout Western Australia. Principal Botanist Narelle Whittington identified collected flora specimens.

Variable	Degree of Limitation (Yes/Partial/No)	Potential Constraints on Survey Outcomes
Timing, weather, season	Partial	The recommended primary flora survey period for the region as per the EPA Technical Guidance, is Spring (September – November). The survey was not undertaken during the recommended primary survey period. Additionally, the rainfall recorded for the three months prior to commencing the survey was below average, and this resulted in dry conditions and sterile flora. It is expected that additional flora taxa would be recorded during the primary survey period or following a significant rain event. This was considered a partial limitation as, although additional flora taxa would have been recorded, it did not represent a constraint to assess the presence of the TEC.
Life Forms Sampled	No	The Survey Area was traversed on foot and detailed mapping notes of all remnant vegetation were undertaken. All flora species encountered within the Survey Area were recorded. A total of 24 vascular flora taxa were recorded from the Survey Area, of which five were introduced flora taxa. Of the 24 flora taxa recorded, three taxa (12.5%), could not be identified to species level because they were sterile at the time of the survey. None of the unknown flora taxa collected were analogous to Threatened or Priority flora taxa identified by the database searches as possible to occur within the Survey Area.
Mapping Reliability	No	Vegetation types were described and mapped based on mapping notes taken during the field survey.
Disturbances (fire, flood etc.)	No	Areas of disturbance associated with weeds, historical clearing, and rehabilitation areas were recorded but were not a constraint on the results of the survey.
Completeness	No	The survey was considered complete for a reconnaissance flora and vegetation survey, and all vegetation types were surveyed and delineated within the Survey Area.

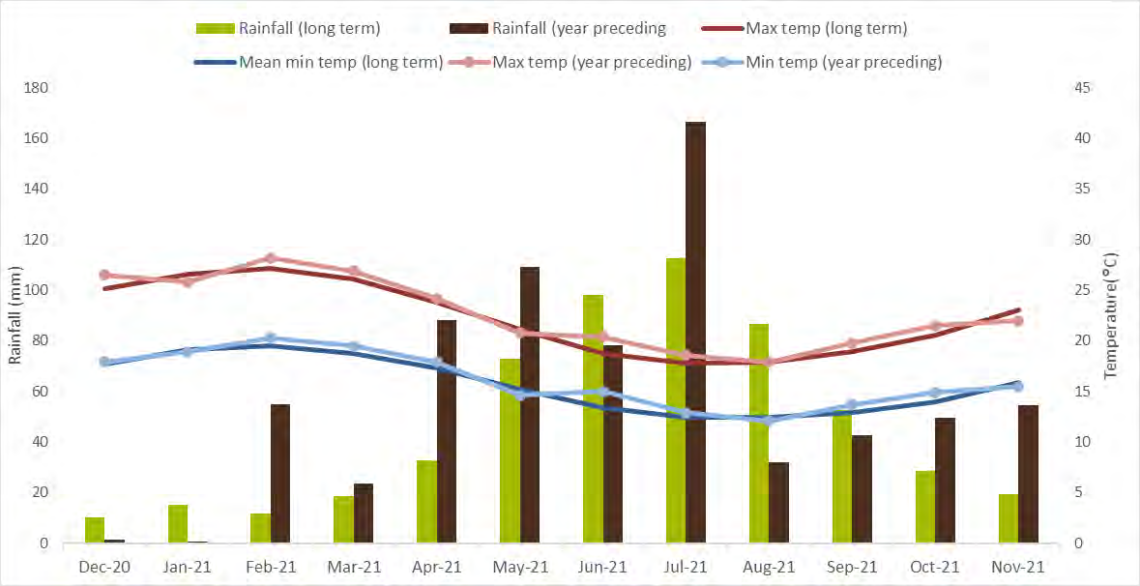
4.2 Desktop Assessment

4.2.1 Climate

The closest long-term Bureau of Meteorology weather station with a complete dataset is Rottnest Island (Station 009193), located approximately 3.6 km east of the Survey Area. Climate statistics were calculated utilising data from the most current climate normal, which is defined as a 30 year interval (Bureau of Meteorology, 2007), where possible. A climate normal is a period long enough to include year-to-year variations while avoiding the influence of longer-term changes in climate (Bureau of Meteorology, 2007).

The long-term mean minimum temperature for Rottnest Island from 12.4˚C (July and August) to 17.8˚C (July) (1983 to 2022) and the long-term mean maximum temperature ranges from 19.5˚C (February) to 27.2˚C (February) (Graph 1) (Bureau of Meteorology, 2022).

The Rottnest Island weather station recorded 232.2 mm of rainfall in the 12 months prior to the survey (November 2020 to October 2021), which is 213.7 mm above the long-term average of 567.7 mm (Bureau of Meteorology, 2021). In the three months prior to the survey (August 2021 to October 2021), 167.5 mm of rainfall was recorded, which is 79.9 mm below the long-term average of 247.4 mm for the same time period (Bureau of Meteorology, 2022).



Graph 1: Long term and Monthly Total Rainfall, Maximum and Minimum temperatures for Rottnest Island (009193) (Bureau of Meteorology, 2022)

4.2.2 Literature Review

4.2.2.1 Rottnest Island Survey

RIA engaged 360 Environmental to conduct a survey to determine the local significance of vegetation, flora and fauna habitat on a portion of land in the north-east of Rottnest Island, between the golf course and 'The Basin', which is located less than 1.0 km northwest of the current Survey Area (360 Environmental Pty Ltd, 2020). The survey was completed on the 24 of November 2020 by Senior Botanist Simon Colwill.

Three vegetation types were identified:

- *Melaleuca lanceolata* tall sparse shrubland over *Acanthocarpus preissii* low heathland over **Trachyandra divaricata* open herbland, which was the dominant vegetation covering 90.1% of the site. This vegetation type had the potential to be considered analogous to the *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain TEC.

- *Acacia rostellifera* mid closed shrubland over *Acanthocarpus preissii* low sparse heathland over **Trachyandra divaricata* sparse herbland covering 4.2% of the site.
- *Eucalyptus gomphocephala* mid open forest over **Trachyandra divaricata* (mixed weed spp.) sparse herbland, which covered 5.7% of the site. Two patches of this vegetation type were identified, and only one was considered analogous to the Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain TEC, which is listed as Critically Endangered.

A total of 30 vascular flora species were recorded, comprising 20 native flora species and 10 weed species. No Threatened or Priority flora were recorded within the site. Weeds were present across the site, with **Trachyandra divaricata* being the most dominant and aggressive weed recorded.

4.2.2.2 Windy Hill Staff Accommodation Project - Assessment Report

360 Environmental was commissioned by the RIA to perform an initial botanical assessment of the site of the proposed Staff Accommodation Project at Windy Hill, which was completed in June 2021 (360 Environmental Pty Ltd, 2021). The focus of the work was to examine vegetation on the site and its surrounds that may have the potential to be part of the '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain' Threatened Ecological Community.

Three vegetation types were identified and mapped during the survey, of which one was identified as having a high chance of being analogous to the TEC.

The February 2022 Survey Area represents an extension of the area previously surveyed by 360 Environmental (2021).

4.2.3 Soil Systems

Soil system mapping of Western Australia describes broad soil and landscape characteristics from regional to local scales, ranging from 1:20,000 to 1:250,000 (Department of Primary Industries and Regional Development, 2018). The Survey Area occurs within the Quindalup South System (211Qu), which is characterised by coastal dunes of the Swan Coastal Plain, with calcareous deep sands and yellow sands, and is represented by coastal scrub (Department of Primary Industries and Regional Development, 2018).

4.2.4 Conservation and Environmentally Sensitive Areas

The Survey Area is identified within a Conservation Area (Department of Biodiversity Conservation and Attractions, 2021), which is vested under the RIA (R 16713).

Environmentally Sensitive Areas (ESAs) are declared by the Department of Water and Environmental Regulation (DWER) to prevent the degradation of important environmental values such as Threatened flora, TECs or significant wetlands.

The entire Survey Area is mapped over an ESA, which is associated with the SCP30a TEC (Department of Water and Environmental Regulation, 2021). Another ESA is identified within 5 km of the Survey Area, which is linked to Government House Lake located west of the Survey Area.

4.2.5 Database Searches

Database searches identified five conservation significant flora taxa occurring within 10 km of the Survey Area, comprising:

- One Threatened taxon, *Diuris micrantha* (Vulnerable)
- Two Priority 1 taxa, *Lachnagrostis nesomytica* subsp. *nesomytica* and *Lachnagrostis nesomytica* subsp. *pseudofiliformis*
- Two Priority 4 taxa, *Myosotis australis* and *Lepidium puberulum*.

A PMST search also identified the TEC Banksia Woodlands of the Swan Coastal Plain ecological community, which is listed as Endangered, within a 5 km buffer of the Survey Area.

4.3 Flora and Vegetation Survey

4.3.1 Flora Composition

The survey recorded a total of 24 taxa from 18 genera across 12 families (Table 2). The dominant families were Poaceae and Myrtaceae (seven taxa each).

No Threatened flora taxa pursuant to the EPBC Act 1999 and/or gazetted as Threatened pursuant to the BC Act 2016 were recorded during the survey. No Priority flora taxa as listed by DBCA were recorded within the Survey Area.

Six introduced flora taxa were recorded within the Survey Area. None are listed as Declared Pests under the BAM Act (Department of Primary Industries and Regional Development, 2022) or WoNS (Department of Agriculture Water and the Environment, 2022b).

Three specimens could not be identified to species level because the taxa were sterile at the time of the survey, *Eucalyptus* sp., *Poa* sp. and Poaceae sp. One of these was not able to be assigned a confirmed genus. None of the unconfirmed flora taxa were analogous to Priority flora taxa identified by the database searches.

Table 2: Inventory of Vascular Flora

Family	Taxa	Status under the BAM Act	WoNS
Asparagaceae	*Acanthocarpus preissii*	-	-
Asphodelaceae	**Trachyandra divaricata*	Permitted – s11	No
Asteraceae	**Dittrichia graveolens*	Permitted – s11	No
Casuarinaceae	**Casuarina glauca*	Permitted – s11	No
Cupressaceae	*Callitris preissii*	-	-
Cyperaceae	*Lepidosperma gladiatum*	-	-
Fabaceae	*Acacia rostellifera*	-	-
Haemodoraceae	*Conostylis candicans* subsp. *calcicola*	-	-
Lamiaceae	*Westringia dampieri*	-	-
Malvaceae	*Guichenotia ledifolia*	-	-
Myrtaceae	*Agonis flexuosa*	-	-
	Eucalyptus gomphocephala	-	-
	Eucalyptus sp.	-	-
	Eucalyptus utilis	-	-
	Melaleuca huegelii	-	-
	Melaleuca lanceolata	-	-
	Melaleuca nesophila	-	-
Pittosporaceae	*Pittosporum ligustrifolium*	-	-
Poaceae	**Cynodon dactylon*	Permitted – s11	No
	Poa poiformis	-	-
	Poa sp.	-	-
	Poaceae sp.	-	-
	**Rostraria cristata*	Permitted – s11	No
	Sporobolus virginicus		-
	**Stenotaphrum secundatum*	Permitted – s11	No

*denotes weed status

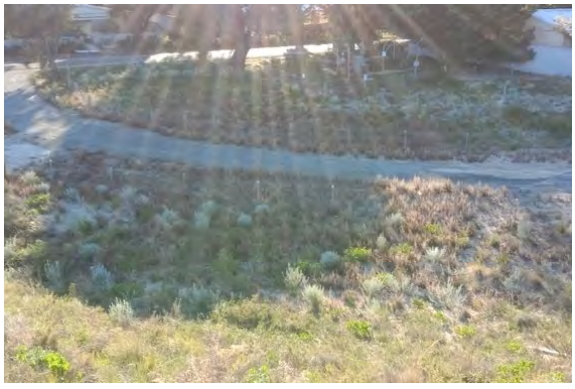
4.3.2 Vegetation Types

Five vegetation types were identified and mapped within the Survey Area (Figure 2).

The remaining of the Survey Area included vegetation rehabilitation areas (0.22 ha, 5.68%) and cleared areas (0.13 ha, 3.40%).

Table 3: Vegetation Types

Vegetation Type Code and Description	Extent and Proportion within the Survey Area	Representative Photo
MlCpAp: *Melaleuca lanceolata* and *Callitris preissii* tall shrubland over *Acanthocarpus preissii*, *Guichenotia ledifolia*, *Conostylis candicans* subsp. *calcicola* low open shrubland over *Poaceae spp.* and *Poa* sp. isolated tussock grasses over **Trachyandra divaricata* and mixed weed spp.	0.29 ha 7.53%	
MlAp: *Melaleuca lanceolata*, **Casuarina glauca*, *Eucalyptus utilis* and *Melaleuca* spp. tall open shrubland over *Acanthocarpus preissii*, *Guichenotia ledifolia*, *Conostylis candicans subsp. calcicola* low open shrubland over *Poaceae* spp. and *Poa* sp. isolated tussock grasses over **Trachyandra divaricata* and mixed weed spp.	2.09 ha 54.17%	
Cg: **Casuarina glauca* tall shrubland over *Acanthocarpus preissii*, *Guichenotia ledifolia*, *Conostylis candicans* subsp. *calcicola* low open shrubland over *Poaceae* spp. and *Poa* sp. isolated tussock grasses over **Trachyandra divaricata* and mixed weed spp.	0.19 ha 4.83%	

Vegetation Type Code and Description	Extent and Proportion within the Survey Area	Representative Photo
Ap: *Acanthocarpus preissii*, *Guichenotia ledifolia*, *Conostylis candicans* subsp. *calcicola* low open shrubland over *Poaceae* spp. and *Poa* sp. isolated tussock grasses over **Trachyandra divaricata* and mixed weed spp.	0.94 ha 24.32%	
Lg: *Pittosporum ligustrifolium* tall isolated shrubs over *Lepidosperma gladiatum* closed sedgeland over *Acanthocarpus preissii, Guichenotia ledifolia* and *Poa* sp.	<0.01 ha 0.10%	
Rehabilitation	0.22 ha 5.69%	
Cleared	0.13 ha 3.37%	N/A
Total	**3.85 ha**	N/A

4.3.3 Vegetation Condition

Vegetation condition within the Survey Area ranged from Good to Completely Degraded (Figure 3), including:

- Good (1.92 ha, 49.75%)
- Degraded (1.59 ha, 41.18%)
- Completely Degraded (0.35 ha, 9.06%).

Disturbances within the Survey Area comprised weeds, historical clearing to facilitate access tracks and infrastructure, and rehabilitation areas. Small portions of the Survey Area may have been considered in Very Good condition, however weed numbers were considered to be higher than they appeared due to the dry conditions. The understorey was heavily affected by weeds across the entire Survey Area.

4.3.4 Vegetation of Conservation Significance

The Banksia Woodlands of the Swan Coastal Plain ecological community identified by the database searches was not present within the Survey Area, as *Banksia* spp. were not recorded.

The State TEC SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain', which is listed as Vulnerable is described as follows:

"*The community is located on calcareous sandy soils of the Quindalup Dunes generally occurring between Craigie and Point Peron and on the Swan River in Peppermint Grove. The community also occurs on Garden Island and Penguin Islands. Species richness is naturally quite low in the community. Typical and common native taxa include: Callitris preissii (Rottnest Island pine), Melaleuca lanceolata (Rottnest Island Teatree), Spyridium globulosum (Basket Bush), Acanthocarpus preissii (Prickle Lily), Rhagodia baccata (Berry Saltbush), Austrostipa flavescens (Spear-grass), and Trachymene pilosa (Native Parsnip)*" (Department of Biodiversity Conservation and Attractions, 2020b).

Community type 30a is restricted to the Quindalup system, on which the Survey Area is located, and represented by forests and woodlands (Gibson et al., 1994). This community lists a further three taxa as being common, **Galium murale*, **Asparagus asparagoides*, and **Trachyandra divaricata*.

Vegetation types MlCpAp and MlAp were represented by *C. preissii* (MlCpAp only) and *M. lanceolata*, which are the key taxa describing the SCP30a TEC, as well as the common community species *Acanthocarpus preissii*, and **Trachyandra divaricata*. For this reason, these vegetation types were considered analogous to the SCP30a TEC. Combined, these two vegetation types cover 2.38 ha (61.69%) of the Survey Area.

The remaining vegetation types did not support the key taxa *C. preissii* and *M. lanceolata* and therefore were not considered analogous to the TEC.

5 Discussion

5.1 Flora

Floristic diversity within the Survey Area was considered low. This was expected due to disturbances such as weeds, tracks and historic clearing, which have resulted in degraded vegetation condition within the Survey Area. The condition of the site was dry, which could be attributed to the below average rainfall recorded within the Survey Area in the three months prior to the field survey. Furthermore, the SCP30a TEC identified within the Survey Area is described as having low floristic diversity due to the dense overstorey with few understorey taxa (Department of Biodiversity Conservation and Attractions, 2020b; Gibson et al., 1994).

No conservation significant flora taxa were recorded within the Survey Area.

Six weed species were recorded in the Survey Area; however, none are listed as WoNS or DPs. The weed species recorded (**Casuarina glauca, *Cynodon dactylon*, *Dittrichia graveolens*, *Rostraria cristata, *Stenotaphrum secundatum* and *Trachyandra divaricata*) have a legal status of Permitted – s11, and do not have an assigned control category.

Weed species were ubiquitous throughout the Survey Area, which was expected due to vegetation condition and disturbances. The Survey Areas were not systematically grid searched, therefore additional weed species and abundance could be recorded with greater survey effort. **Trachyandra divaricata* in particular was considered to be present in large numbers across the entirety of the Survey Area.

5.2 Vegetation

The vegetation of the Survey Area comprised remnant vegetation, native regrowth, planted natives and weed species.

The previous survey undertaken in June 2021 was inconclusive as to whether the vegetation in the south-eastern portion of the Survey Area was analogous to the TEC, the June 2021 Survey Area did not include any individuals of *C. preissii*. The current Survey Area included an expansion to the southeast which aided to confirm the presence of the TEC due to the key taxon *C. preissii*.

Two vegetation types within the Survey Area were considered analogous to the State TEC SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain' ecological community. It was noted that areas of these vegetation types continued outside of the Survey Area to the south and east. Further advice can be sought from the Communities branch of the DBCA to confirm the presence and extent of this TEC within the Survey Area. Condition varied in these areas from Good to Degraded, as multiple other dominant (*Melaleuca* spp. and *Eucalyptus* spp.) individuals were present. However, across the general area the two descriptive tall shrubs (*C. preissii* and *M. lanceolata*) are considered to be generally dominant and should be treated holistically as a larger patch, analogous to the TEC.

Rehabilitation areas are considered to be Completely Degraded as the clearing laws only apply to native vegetation, whose definition in the EP Act does not include native species in a plantation. Under Section 51A of the EP Act, native vegetation does not include vegetation that is intentionally sown, planted or propagated unless:

- The vegetation was sown, planted or propagated as required under the EP Act or another written law; or
- It is declared to be native vegetation under the regulations.

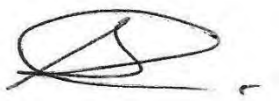
Most of the Survey Area comprises native vegetation (3.50 ha, 90.94%). Additionally, the Survey Area is entirely mapped over an ESA and Conservation Area, and therefore may be subject to Native Vegetation regulations if clearing was proposed for the area.

6 Conclusion

- One Threatened flora taxon pursuant to the EPBC Act 1999 and/or gazetted as Threatened Flora pursuant to the BC Act 2016 was identified as occurring within 10 km of the Survey Area by database searches, *Diuris micrantha* (Vulnerable). No Threatened flora taxa were recorded during the field survey.
- The database searches identified four Priority flora taxa as occurring within 10 km of the Survey Area. None were recorded within the Survey Area.
- Five introduced flora taxa were recorded during the survey. None of these are listed as Declared Pests under the BAM Act or WoNS.
- Five vegetation types were mapped within the Survey Area. Two vegetation types were considered analogous to the State TEC SCP30a '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain' ecological community.

We trust this meets your requirements. Should you have any questions or require further action please do not hesitate to contact Simon Colwill or the undersigned on (08) 9388 8360. We look forward to hearing from you.

For and on behalf of 360 Environmental Pty Ltd



Scott Walker – Principal Ecologist/Group Leader

Enc:
Figure 1: Survey Area
Figure 2: Vegetation Types and TEC Extent
Figure 3: Vegetation Condition

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Figures

Legend

- Survey Area
- June 2021 Survey Area

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2022
- OTHER DATA SOURCED LANDGATE 2022
- AERIAL PHOTOGRAPHY SOURCED LANDGATE 2022
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LOCALITY MAP

PROJECT ID	DATE
5185	30/03/2022

HORIZONTAL DATUM AND PROJECTION
GDA2020 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
CL	BD	SB	0

Rottnest Island Authority

Windy Hill

Windy Hill TEC Assessment

Figure 1
Survey Area

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K:\Projects\1.0 EBS\5185 Windy Hill TEC Assessment\5185 F01 Survey Area.mxd

Legend

- Survey Area

Vegetation Types

- Ap
- Cg
- Lg
- MlAp
- MlCpAp
- Rehabilitation
- Cleared
- Threatened Ecological Communities

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
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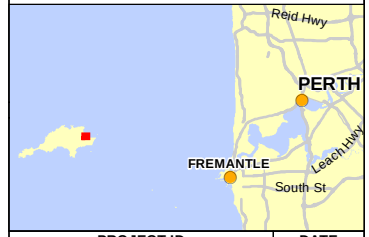
LOCALITY MAP



PROJECT ID	DATE
5185	31/03/2022

HORIZONTAL DATUM AND PROJECTION
GDA2020 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
CL	BD	SB	0

Rottnest Island Authority

Windy Hill

Windy Hill TEC Assessment

Figure 2

Vegetation Types and TEC Extent

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Legend

Survey Area

Vegetation Condition

Good

Degraded

Completely Degraded

- NOTE THAT POSITION ERRORS CAN BE >5M IN SOME AREAS
- LOCALITY MAP SOURCED LANDGATE 2022
- OTHER DATA SOURCED LANDGATE 2022
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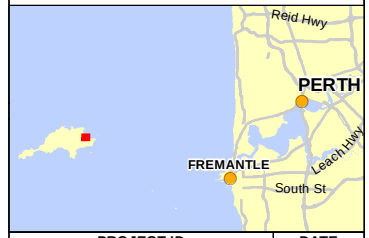
LOCALITY MAP



PROJECT ID	DATE
5185	31/03/2022

HORIZONTAL DATUM AND PROJECTION
GDA2020 MGA Zone 50

CREATED	CHECKED	APPROVED	REVISION
CL	BD	SB	0

Rottnest Island Authority

Windy Hill

Windy Hill TEC Assessment

Figure 3

Vegetation Condition

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Appendices

Appendix A
NatureMap

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 23/11/2020

Kingdom Plantae
Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 32' 05" E,31° 59' 26" S
Buffer 10km
Group By Family

Family	Species	Records
Acrotylaceae	3	10
Aizoaceae	4	18
Alliaceae	1	1
Amaranthaceae	1	4
Amaryllidaceae	4	8
Anadyomenaceae	2	8
Apiaceae	2	7
Apocynaceae	3	15
Araceae	1	9
Araliaceae	6	11
Arecaceae	4	4
Areschougiaceae	10	26
Asparagaceae	6	23
Asphodelaceae	2	12
Asteraceae	27	80
Bignoniaceae	1	1
Bonnemaisoniaceae	2	13
Boodleaceae	2	13
Boraginaceae	2	4
Brassicaceae	10	35
Bryopsidaceae	5	5
Campanulaceae	1	3
Caryophyllaceae	10	40
Casuarinaceae	3	5
Caulerpaceae	21	103
Celastraceae	1	4
Centrolepidaceae	1	2
Ceramiaceae	18	33
Champiaceae	3	8
Chenopodiaceae	13	41
Cladophoraceae	10	25
Codiaceae	7	28
Colchicaceae	1	2
Convolvulaceae	2	9
Corallinaceae	11	68
Crassulaceae	7	16
Cupressaceae	1	4
Cymodoceaceae	4	8
Cyperaceae	12	25
Cystocloniaceae	5	12
Dasyaceae	5	5
Delesseriaceae	9	19
Derbesiaceae	1	1
Dichotomosiphonaceae	1	1
Dicranemataceae	2	8
Dilleniaceae	1	1
Droseraceae	1	2
Ericaceae	3	14
Euphorbiaceae	4	38
Fabaceae	12	48
Faucheaceae	2	2
Francoaceae	1	3
Frankeniaceae	1	1
Galaxauraceae	5	38
Gelidiaceae	4	27
Gentianaceae	4	11
Geraniaceae	4	11
Goodeniaceae	1	5
Gracilariaceae	5	13
Haemodoraceae	2	10
Halimedaceae	1	14
Haloragaceae	1	1
Halymeniaceae	10	37
Hemerocallidaceae	2	2
Hydrocharitaceae	2	3
Hymenocladiaceae	2	4
Hypoxidaceae	1	1
Iridaceae	6	19
Juncaceae	2	2
Juncaginaceae	4	11
Kallymeniaceae	5	8
Lamiaceae	1	7
Liagoraceae	10	33
Loganiaceae	1	1
Lomentariaceae	2	3

Loranthaceae	1	1
Malvaceae	6	38
Meliaceae	1	3
Montiaceae	2	5
Moraceae	5	9
Mychodeaceae	2	3
Myrtaceae	12	20
Nitrariaceae	1	4
Nizymeniaceae	2	5
Oleaceae	1	3
Orchidaceae	3	8
Orobanchaceae	2	2
Oxalidaceae	3	7
Peyssonneliaceae	3	12
Phacelocarpaceae	2	2
Phyllanthaceae	2	7
Pinaceae	2	2
Pittosporaceae	1	11
Plantaginaceae	4	9
Plocamiaceae	4	7
Poaceae	46	200
Polygalaceae	2	3
Polyidaceae	2	19
Polyphysaceae	1	2
Portulacaceae	1	1
Posidoniaceae	2	3
Potamogetonaceae	1	4
Pottiaceae	3	3
Primulaceae	2	17
Ranunculaceae	3	12
Resedaceae	2	8
Rhamnaceae	2	12
Rhodomelaceae	23	55
Rhodymeniaceae	7	31
Rubiaceae	1	13
Ruppiaceae	2	6
Rutaceae	2	9
Sapindaceae	1	1
Sarcomeniaceae	1	1
Schizymeniaceae	1	8
Scinaiaceae	2	5
Scrophulariaceae	5	24
Sebdeniaceae	1	3
Siphonocladaceae	4	8
Solanaceae	5	20
Solieriaceae	2	4
Spongitaceae	1	1
Stylidiaceae	1	1
Tamaricaceae	1	3
Typhaceae	1	1
Udoteaceae	4	13
Ulvaceae	3	7
Urticaceae	3	22
Valoniaceae	1	2
Wrangeliaceae	5	6
Zygophyllaceae	2	3
TOTAL	**552**	**1836**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Acrotylaceae					
1.	26456	*Amphiplexia hymenocladioides*			
2.	26665	*Claviclonium ovatum*			
3.	26915	*Hennedya crispa*			
Aizoaceae					
4.	2798	*Carpobrotus virescens (Coastal Pigface, Kolboko, Bain)*			
5.	2813	*Mesembryanthemum crystallinum (Iceplant)*	Y		
6.	2820	*Tetragonia decumbens (Sea Spinach)*	Y		
7.	2823	*Tetragonia implexicoma (Bower Spinach)*			
Alliaceae					
8.	1374	*Allium ampeloprasum*	Y		
Amaranthaceae					
9.	2689	*Hemichroa pentandra (Trailing Jointweed)*			
Amaryllidaceae					
10.	1493	*Leucojum aestivum (Snowflake)*	Y		
11.	11019	*Narcissus papyraceus*	Y		
12.	1495	*Narcissus tazetta (Jonquil)*	Y		
13.	44496	*Narcissus tazetta subsp. italicus*	Y		
Anadyomenaceae					
14.	35123	*Microdictyon okamurae*			
15.	27074	*Microdictyon umbilicatum*			
Apiaceae					
16.	6210	*Apium annuum*			
17.	6218	*Daucus glochidiatus (Australian Carrot)*			
Apocynaceae					
18.	6565	*Alyxia buxifolia (Dysentery Bush)*			
19.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
20.	18356	*Nerium oleander*	Y		
Araceae					
21.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		
Araliaceae					
22.	6224	*Hydrocotyle blepharocarpa*			
23.	6229	*Hydrocotyle diantha*			
24.	6232	*Hydrocotyle hispidula*			
25.	6241	*Hydrocotyle tetragonocarpa*			
26.	6266	*Trachymene coerulea (Blue Lace Flower)*			
27.	19041	*Trachymene coerulea subsp. coerulea*			
Arecaceae					
28.	44540	*Phoenix canariensis (Canary Islands Date Palm)*	Y		
29.	1042	*Phoenix dactylifera (Date Palm)*	Y		
30.	17910	*Washingtonia filifera*	Y		
31.		*Washingtonia robusta*			Y
Areschougiaceae					
32.	26484	*Areschougia ligulata*			
33.	26533	*Callophycus costatus*			
34.	26534	*Callophycus dorsifer*			
35.	26535	*Callophycus harveyanus*			
36.	26536	*Callophycus oppositifolius*			
37.	26823	*Erythroclonium sonderi*			
38.	26854	*Gigartina disticha*			
39.	27062	*Meristotheca papulosa*			
40.	27210	*Rhabdonia clavigera*			
41.	27230	*Sarconema filiforme*			
Asparagaceae					
42.	1208	*Acanthocarpus preissii*			
43.	1505	*Agave americana (Century Plant)*	Y		
44.	47094	*Agave attenuata*	Y		
45.	18379	*Agave sisalana*	Y		Y
46.	1372	*Ornithogalum arabicum (Lesser Cape Lily)*	Y		
47.	1343	*Thysanotus patersonii*			
Asphodelaceae					

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
48.	1364	*Asphodelus fistulosus (Onion Weed)*	Y		
49.	1368	*Trachyandra divaricata*	Y		
Asteraceae					
50.	7833	*Angianthus preissianus*			
51.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
52.	7839	*Arctotheca populifolia (Dune Arctotheca, Beach Pumpkin, Coast Capeweed, Beach Daisy)*	Y		
53.	7841	*Argyranthemum frutescens (Marguerite)*	Y		
54.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
55.	7916	*Centaurea melitensis (Maltese Cockspur, Malta Thistle)*	Y		
56.	7937	*Cirsium vulgare (Spear Thistle, Scotch Thistle)*	Y		
57.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		
58.	7941	*Conyza parva*	Y		
59.	20074	*Conyza sumatrensis*	Y		
60.	7943	*Cotula australis (Common Cotula)*			
61.	7944	*Cotula bipinnata (Ferny Cotula)*	Y		
62.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
63.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
64.	20247	*Gamochaeta calviceps*	Y		
65.	7983	*Gnaphalium indutum (Tiny Cudweed)*			
66.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
67.	44490	*Leontodon rhagadioloides*	Y		
68.	16449	*Leucophyta brownii*			
69.	8105	*Millotia myosotidifolia*			
70.	8127	*Olearia axillaris (Coastal Daisybush)*			
71.	8182	*Podotheca angustifolia (Sticky Longheads)*			
72.	25884	*Senecio pinnatifolius var. latilobus*			
73.	25882	*Senecio pinnatifolius var. maritimus (Coastal Groundsel)*			
74.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
75.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
76.	13328	*Waitzia nitida*			
Bignoniaceae					
77.	17923	*Tecoma stans*	Y		
Bonnemaisoniaceae					
78.	26486	*Asparagopsis taxiformis*			
79.	26757	*Delisea pulchra*			
Boodleaceae					
80.	27141	*Phyllodictyon anastomosans*			
81.	27318	*Struvea plumosa*			
Boraginaceae					
82.	6707	*Heliotropium curassavicum (Smooth Heliotrope)*			
83.	6722	*Myosotis australis (Southern Forget-me-not)*		P4	
Brassicaceae					
84.	3002	*Cakile maritima (Sea Rocket)*	Y		
85.	3005	*Cardamine hirsuta (Common Bittercress)*	Y		
86.	3011	*Diplotaxis muralis (Wall Rocket)*	Y		
87.	3016	*Heliophila pusilla*	Y		
88.	18137	*Hornungia procumbens*	Y		
89.	19989	*Lepidium didymum*	Y		
90.	3027	*Lepidium foliosum (Leafy Peppercress)*			
91.	3043	*Lepidium puberulum*		P4	
92.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
93.	3072	*Sisymbrium orientale (Indian Hedge Mustard)*	Y		
Bryopsidaceae					
94.	26521	*Bryopsis australis*			
95.		*Bryopsis gemellipara*			
96.	26523	*Bryopsis macraildii*			
97.	26525	*Bryopsis plumosa*			
98.	27191	*Pseudobryopsis hainanensis*			
Campanulaceae					
99.	9289	*Lobelia anceps (Angled Lobelia)*			
Caryophyllaceae					
100.	19883	*Arenaria leptoclados*	Y		
101.	13119	*Cerastium balearicum*	Y		
102.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
103.	16693	*Minuartia mediterranea*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
			Y		
104.	2905	*Polycarpon tetraphyllum (Fourleaf Allseed)*	Y		
105.	2906	*Sagina apetala (Annual Pearlwort)*	Y		
106.	2908	*Sagina maritima*	Y		
107.	2910	*Silene nocturna (Mediterranean Catchfly)*	Y		
108.	2918	*Stellaria media (Chickweed)*	Y		
109.	20397	*Stellaria pallida*	Y		
Casuarinaceae					
110.	19842	*Casuarina equisetifolia*	Y		
111.	18321	*Casuarina glauca*	Y		
112.	1742	*Casuarina obesa (Swamp Sheoak, Kuli)*			
Caulerpaceae					
113.	26553	*Caulerpa articulata*			
114.	26556	*Caulerpa cactoides*			
115.	26559	*Caulerpa cupressoides*			
116.	47053	*Caulerpa cupressoides var. cupressoides*			
117.	44539	*Caulerpa cylindracea*			
118.	26561	*Caulerpa ellistoniae*			
119.	26562	*Caulerpa fergusonii*			
120.	26563	*Caulerpa flexilis*			
121.	27380	*Caulerpa flexilis var. muelleri*			
122.	48455	*Caulerpa geminata*			
123.	26564	*Caulerpa hedleyi*			
124.	26565	*Caulerpa heterophylla*			
125.	26568	*Caulerpa lentillifera*			
126.	27382	*Caulerpa longifolia forma crispata*			
127.	26570	*Caulerpa obscura*			
128.	26571	*Caulerpa papillosa*			
129.	37643	*Caulerpa parvifolia*			
130.	26574	*Caulerpa scalpelliformis*			
131.	26575	*Caulerpa sedoides*			
132.	26578	*Caulerpa simpliciuscula*			
133.	46993	*Caulerpa taxifolia var. distichophylla*			
Celastraceae					
134.	9070	*Stackhousia pubescens (Downy Stackhousia)*			
Centrolepidaceae					
135.	1134	*Centrolepis polygyna (Wiry Centrolepis)*			
Ceramiaceae					
136.	26447	*Acrothamnion preissii*			
137.	26465	*Anisoschizus propaguli*			Y
138.	27374	*Anotrichium tenue var. thyrsigerum*			Y
139.	26475	*Antithamnion hanovioides*			
140.	26500	*Balliella hirsuta*			Y
141.	26511	*Bornetia binderiana*			
142.	26587	*Centroceras clavulatum*			
143.	26593	*Ceramium filicula*			
144.	26599	*Ceramium puberulum*			
145.	26600	*Ceramium pusillum*			
146.	26797	*Drewiana nitella*			
147.	26829	*Euptilocladia spongiosa*			
148.	26830	*Euptilota articulata*			
149.	26887	*Guiryella repens*			
150.	27194	*Psilothallia striata*			
151.	27286	*Spermothamnion miniatum*			Y
152.	27309	*Spyridia dasyoides*			
153.	27310	*Spyridia filamentosa*			
Champiaceae					
154.	26616	*Champia affinis*			
155.	26617	*Champia compressa*			
156.	26619	*Champia stipitata*			
Chenopodiaceae					
157.	2452	*Atriplex cinerea (Grey Saltbush)*			
158.	2463	*Atriplex isatidea (Coast Saltbush)*			
159.	2494	*Chenopodium murale (Nettle-leaf Goosefoot)*	Y		
160.	12064	*Enchylaena tomentosa var. tomentosa (Barrier Saltbush)*			
161.	2578	*Rhagodia baccata (Berry Saltbush)*			
162.	11341	*Rhagodia baccata subsp. baccata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
163.	11930	*Rhagodia baccata subsp. dioica (Sea Berry Saltbush)*			
164.	48433	*Salicornia blackiana*			
165.	48430	*Salicornia quinqueflora*			
166.	2639	*Suaeda australis (Seablite)*			
167.	33236	*Tecticornia halocnemoides (Shrubby Samphire)*			
168.	33319	*Tecticornia indica subsp. bidens*			
169.	2644	*Threlkeldia diffusa (Coast Bonefruit)*			
Cladophoraceae					
170.	26481	*Apjohnia laetevirens*			
171.	26607	*Chaetomorpha aerea*			
172.	26649	*Cladophora albida*			
173.	48391	*Cladophora dalmatica*			
174.	26653	*Cladophora laetevirens*			
175.	26654	*Cladophora lehmanniana*			
176.	26656	*Cladophora prolifera*			
177.	48667	*Cladophora rhizoclonioidea*			
178.	48668	*Cladophora subsimplex*			
179.	26659	*Cladophora valonioides*			
Codiaceae					
180.	26671	*Codium duthieae*			
181.	26672	*Codium galeatum*			
182.	26675	*Codium laminarioides*			
183.	26676	*Codium lucasii*			
184.	26678	*Codium muelleri*			
185.	26679	*Codium perriniae*			
186.	26683	*Codium spongiosum*			
Colchicaceae					
187.	1398	*Wurmbea monantha*			
Convolvulaceae					
188.	6616	*Dichondra repens (Kidney Weed)*			
189.	6659	*Wilsonia humilis (Silky Wilsonia)*			
Corallinaceae					
190.	26458	*Amphiroa anceps*			
191.	26463	*Amphiroa gracilis*			
192.	26984	*Jania affinis*			
193.	26985	*Jania micrarthrodia*			
194.	36141	*Jania pulchella*			
195.	48292	*Jania rosea*			
196.	26988	*Jania verrucosa*			
197.	27067	*Metagoniolithon chara*			
198.	27068	*Metagoniolithon radiatum*			
199.	27069	*Metagoniolithon stelliferum*			
200.	27070	*Metamastophora flabellata*			
Crassulaceae					
201.	3137	*Crassula colorata (Dense Stonecrop)*			
202.	11563	*Crassula colorata var. colorata*			
203.	3138	*Crassula decumbens (Rufous Stonecrop)*			
204.	11349	*Crassula decumbens var. decumbens*			
205.	3140	*Crassula glomerata*	Y		
206.	15706	*Crassula natans var. minus*	Y		
207.	11345	*Crassula thunbergiana subsp. thunbergiana*	Y		
Cupressaceae					
208.	96	*Callitris preissii (Rottnest Island Pine, Maro)*			
Cymodoceaceae					
209.	126	*Amphibolis antarctica (Sea Nymph)*			
210.	127	*Amphibolis griffithii*			
211.	132	*Syringodium isoetifolium*			
212.	134	*Thalassodendron pachyrhizum*			
Cyperaceae					
213.	743	*Baumea juncea (Bare Twigrush)*			
214.	43241	*Carex thecata*			
215.	20216	*Ficinia nodosa (Knotted Club Rush)*			
216.	907	*Gahnia trifida (Coast Saw-sedge)*			
217.	20200	*Isolepis cernua var. setiformis*			
218.	917	*Isolepis marginata (Coarse Club-rush)*			
219.	42742	*Lepidosperma calcicola*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
220.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
221.	940	*Lepidosperma pubisquameum*			
222.	945	*Lepidosperma squamatum*			
223.	994	*Schoenus humilis*			
224.	1004	*Schoenus nitens (Shiny Bog-rush)*			
Cystocloniaceae					
225.	26966	*Hypnea charoides*			
226.	35922	*Hypnea cornuta*			
227.	35898	*Hypnea musciformis*			
228.	26971	*Hypnea ramentacea*			
229.	26973	*Hypnea valentiae*			
Dasyaceae					
230.	26738	*Dasya elongata*			
231.	26749	*Dasya villosa*			
232.	26929	*Heterosiphonia callithamnium*			
233.	26930	*Heterosiphonia crassipes*			
234.	26938	*Heterosiphonia wrangelioides*			
Delesseriaceae					
235.	26622	*Chauviniella coriifolia*			
236.	26911	*Haraldiophyllum erosum*			
237.	26914	*Hemineura frondosa*			
238.	26927	*Heterodoxia denticulata*			
239.	26981	*Hypoglossum revolutum*			
240.	27055	*Martensia australis*			
241.	48414	*Martensia denticulata*			
242.	36360	*Platyclinia ramosa*			Y
243.	27146	*Platysiphonia hypneoides*			
Derbesiaceae					
244.	27120	*Pedobesia clavaeformis*			
Dichotomosiphonaceae					
245.	26497	*Avrainvillea clavatiramea*			
Dicranemataceae					
246.	26758	*Dicranema revolutum*			
247.	27347	*Tylotus obtusatus*			
Dilleniaceae					
248.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
Droseraceae					
249.	3128	*Drosera ramellosa (Branched Sundew)*			
Ericaceae					
250.	6295	*Acrotriche cordata (Coast Ground Berry)*			
251.	6405	*Leucopogon insularis*			
252.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
Euphorbiaceae					
253.	4601	*Beyeria viscosa (Pinkwood)*			
254.	4636	*Euphorbia paralias (Sea Spurge)*	Y		
255.	4638	*Euphorbia peplus (Petty Spurge)*	Y		
256.	4705	*Ricinus communis (Castor Oil Plant)*	Y		
Fabaceae					
257.	3282	*Acacia cyclops (Coastal Wattle)*			
258.	3424	*Acacia littorea*			
259.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
260.	3584	*Acacia truncata*			
261.	48860	*Erythrostemon gilliesii*	Y		
262.	4079	*Medicago polymorpha (Burr Medic)*	Y		
263.	4080	*Medicago sativa (Alfalfa)*	Y		
264.	4085	*Melilotus indicus*	Y		
265.	4256	*Templetonia retusa (Cockies Tongues)*			
266.	4314	*Trifolium suffocatum (Suffocated Clover)*	Y		
267.	4315	*Trifolium tomentosum (Woolly Clover)*	Y		
268.	15509	*Trifolium tomentosum var. tomentosum*	Y		
Faucheaceae					
269.	26860	*Gloiocladia halymenioides*			
270.	27361	*Webervanbossea kaliformis*			

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Francoaceae					
271.	4785	*Melianthus major*	Y		
Frankeniaceae					
272.	5209	*Frankenia pauciflora (Seaheath)*			
Galaxauraceae					
273.	29616	*Dichotomaria marginata*			
274.	29615	*Dichotomaria obtusata*			
275.	34959	*Dichotomaria spathulata*			
276.	26835	*Galaxaura rugosa*			
277.	27340	*Tricleocarpa cylindrica*			
Gelidiaceae					
278.	26847	*Gelidium australe*			Y
279.	26849	*Gelidium pusillum*			
280.	27195	*Pterocladia lucida*			
281.	27206	*Ptilophora prolifera*			
Gentianaceae					
282.	6539	*Centaurium erythraea (Common Centaury)*	Y		
283.	17800	*Centaurium pulchellum*	Y		
284.	6542	*Centaurium tenuiflorum*	Y		
285.	41660	*Schenkia australis*			
Geraniaceae					
286.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
287.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
288.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
289.	4346	*Pelargonium littorale*			
Goodeniaceae					
290.	7606	*Scaevola crassifolia (Thick-leaved Fan-flower)*			
Gracilariaceae					
291.	48979	*Crassa secundata*			
292.	26712	*Curdiea obesa*			
293.	26867	*Gracilaria blodgettii*			
294.	26872	*Gracilaria preissiana*			
295.	26873	*Gracilaria salicornia*			
Haemodoraceae					
296.	1427	*Conostylis candicans (Grey Cottonhead)*			
297.	12027	*Conostylis candicans subsp. calcicola*			
Halimedaceae					
298.	47213	*Halimeda versatilis*			
Haloragaceae					
299.	6161	*Gonocarpus pithyoides*			
Halymeniaceae					
300.	26546	*Carpopeltis elata*			
301.	26547	*Carpopeltis phyllophora*			
302.	26548	*Carpopeltis spongeaplexus*			
303.	26667	*Codiophyllum flabelliforme*			
304.	26708	*Cryptonemia kallymenioides*			
305.	26818	*Epiphloea bullosa*			
306.	26850	*Gelinaria ulvoidea*			
307.	36701	*Grateloupia subpectinata*			
308.	37640	*Halymenia floresii*			
309.	48666	*Halymenia harveyana*			
Hemerocallidaceae					
310.	19632	*Johnsonia pubescens subsp. pubescens*			
311.	43506	*Phormium tenax*	Y		
Hydrocharitaceae					
312.	164	*Halophila ovalis (Sea Wrack)*			
313.	166	*Hydrilla verticillata (Water Thyme)*			
Hymenocladiaceae					
314.	26826	*Erythrymenia minuta*			
315.	26961	*Hymenocladia conspersa*			
Hypoxidaceae					
316.	43763	*Pauridia glabella*			

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Iridaceae					
317.	1515	*Ferraria crispa (Black Flag)*	Y		
318.	11445	*Ferraria crispa subsp. crispa*	Y		
319.	1531	*Iris germanica (Flag Iris)*	Y		
320.	19179	*Moraea flaccida (One-leaf Cape Tulip)*	Y		
321.	19180	*Moraea miniata (Two-leaf Cape Tulip)*	Y		
322.	11544	*Romulea rosea var. australis (Guildford Grass)*	Y		
Juncaceae					
323.	1178	*Juncus bufonius (Toad Rush)*	Y		
324.	11922	*Juncus kraussii subsp. australiensis*			
Juncaginaceae					
325.	146	*Triglochin minutissima*			
326.	147	*Triglochin mucronata*			
327.	151	*Triglochin striata*			
328.	152	*Triglochin trichophora*			
Kallymeniaceae					
329.	48417	*Austrokallymenia roensis*			Y
330.	26858	*Glaphyrymenia pustulosa*			
331.	26991	*Kallymenia spinosa*			Y
332.	48419	*Leiomenia cribrosa*			
333.	48423	*Stauromenia lacerata*			
Lamiaceae					
334.	6939	*Westringia dampieri*			
Liagoraceae					
335.	26794	*Dotyophycus abbottiae*			
336.	26837	*Ganonema farinosum*			
337.	26912	*Helminthocladia australis*			
338.	26913	*Helminthora australis*			
339.	27020	*Liagora australasica*			
340.	27024	*Liagora izziae*			Y
341.	27030	*Liagora wilsoniana*			
342.	44525	*Neoizziella divaricata*			
343.	29601	*Titanophycus validus*			
344.	27370	*Yamadaella caenomyce*			
Loganiaceae					
345.	16825	*Phyllangium divergens*			
Lomentariaceae					
346.	35913	*Gelidiopsis scoparia*			
347.	27277	*Semnocarpa minuta*			
Loranthaceae					
348.	2396	*Lysiana casuarinae*			
Malvaceae					
349.	5011	*Guichenotia ledifolia*			
350.	14646	*Lagunaria patersonia*	Y		
351.	36480	*Malva arborea (Tree Mallow)*	Y		
352.	4961	*Malva parviflora (Marshmallow)*	Y		
353.	31351	*Malva preissiana*			
354.	5077	*Thomasia cognata*			
Meliaceae					
355.	4516	*Melia azedarach (White Cedar)*			
Montiaceae					
356.	2845	*Calandrinia brevipedata (Short-stalked Purslane)*			
357.	40827	*Calandrinia tholiformis*			
Moraceae					
358.	1747	*Ficus carica (Common Fig)*	Y		
359.		*Ficus elastica*			
360.		*Ficus macrophylla*			
361.		*Ficus microcarpa subsp. hillii*			Y
362.	47095	*Ficus rubiginosa*	Y		Y
Mychodeaceae					
363.	27079	*Mychodea carnosa*			
364.	27083	*Mychodea pusilla*			
Myrtaceae					

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365.	17202	*Agonis flexuosa var. flexuosa*			
366.	5580	*Eucalyptus camaldulensis (River Gum, Yabalinyba)*			
367.	35345	*Eucalyptus camaldulensis subsp. obtusa (Blunt-budded River Red Gum)*			
368.	5615	*Eucalyptus decipiens (Limestone Marlock, Moit)*			
369.	5638	*Eucalyptus erythrocorys (Illyarrie)*			
370.	5659	*Eucalyptus gomphocephala (Tuart, Duart)*			
371.	5775	*Eucalyptus spathulata (Swamp Mallet)*			
372.	18085	*Eucalyptus utilis*			
373.	19721	*Melaleuca armillaris*	Y		
374.	5920	*Melaleuca huegelii (Chenille Honeymyrtle)*			
375.	5922	*Melaleuca lanceolata (Rottnest Teatree, Moonah)*			
376.	5943	*Melaleuca nesophila (Mindiyed)*			
Nitrariaceae					
377.	4366	*Nitraria billardierei (Nitre Bush)*			
Nizymeniaceae					
378.	27103	*Nizymenia conferta*			
379.	27104	*Nizymenia furcata*			
Oleaceae					
380.	6503	*Olea europaea (Olive)*	Y		
Orchidaceae					
381.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
382.	10916	*Cyrtostylis huegelii*			
383.	1674	*Prasophyllum giganteum (Bronze Leek Orchid)*			
Orobanchaceae					
384.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
385.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
Oxalidaceae					
386.	4349	*Oxalis corniculata (Yellow Wood Sorrel)*	Y		
387.	30375	*Oxalis exilis*			
388.	4356	*Oxalis pes-caprae (Soursob)*	Y		
Peyssonneliaceae					
389.	27128	*Peyssonnelia inamoena*			
390.	27129	*Peyssonnelia novae-hollandiae*			
391.	44731	*Sonderophycus capensis*			
Phacelocarpaceae					
392.	27133	*Phacelocarpus labillardieri*			
393.	27134	*Phacelocarpus peperocarpos*			
Phyllanthaceae					
394.	4675	*Phyllanthus calycinus (False Boronia)*			
395.	4688	*Poranthera drummondii*			
Pinaceae					
396.	17671	*Pinus halepensis*	Y		
397.	88	*Pinus radiata (Radiata Pine)*	Y		
Pittosporaceae					
398.	19745	*Pittosporum ligustrifolium*			
Plantaginaceae					
399.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
400.	7053	*Cymbalaria muralis (Ivyleaf Toadflax)*	Y		
401.	7299	*Plantago debilis*			
402.	7303	*Plantago lanceolata (Ribwort Plantain)*	Y		
Plocamiaceae					
403.	27154	*Plocamium angustum*			
404.	27155	*Plocamium cartilagineum*			
405.	27156	*Plocamium mertensii*			
406.	27157	*Plocamium preissianum*			
Poaceae					
407.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
408.	17237	*Austrostipa elegantissima*			
409.	17240	*Austrostipa flavescens*			
410.		*Austrostipa sp.*			
411.	231	*Avellinia michelii*	Y		
412.	233	*Avena barbata (Bearded Oat)*	Y		
413.	8661	*Brachypodium distachyon (False Brome)*	Y		

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414.	245	*Briza minor (Shivery Grass)*	Y		
415.	247	*Bromus arenarius (Sand Brome)*			
416.	249	*Bromus diandrus (Great Brome)*	Y		
417.	250	*Bromus hordeaceus (Soft Brome)*	Y		
418.	252	*Bromus madritensis (Madrid Brome)*	Y		
419.	253	*Bromus rubens (Red Brome)*	Y		
420.	13685	*Catapodium rigidum (Rigid Fescue)*	Y		
421.	41564	*Cenchrus clandestinus (Kikuyu Grass)*	Y		
422.	277	*Cortaderia selloana (Pampas Grass)*	Y		
423.	283	*Cynodon dactylon (Couch)*	Y		
424.	346	*Ehrharta brevifolia (Annual Veldt Grass)*	Y		
425.	11485	*Ehrharta brevifolia var. cuspidata*	Y		
426.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
427.	376	*Eragrostis curvula (African Lovegrass)*	Y		
428.	449	*Hordeum leporinum (Barley Grass)*	Y		
429.	30331	*Lachnagrostis nesomytica*			Y
430.	30332	*Lachnagrostis nesomytica subsp. nesomytica*		P1	Y
431.	30333	*Lachnagrostis nesomytica subsp. pseudofiliformis*		P1	Y
432.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
433.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
434.	485	*Microlaena stipoides (Weeping Grass)*			
435.	516	*Parapholis incurva (Coast Barbgrass)*	Y		
436.	571	*Poa annua (Winter Grass)*	Y		
437.	577	*Poa poiformis (Coastal Poa)*			
438.	581	*Polypogon maritimus (Coast Beardgrass)*	Y		
439.	35157	*Polypogon maritimus var. subspatheaceus*	Y		
440.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
441.	583	*Polypogon tenellus*			
442.	10970	*Rostraria cristata*	Y		
443.	40426	*Rytidosperma occidentale*			
444.	616	*Sorghum bicolor (Grain Sorghum)*	Y		
445.	624	*Spinifex hirsutus (Hairy Spinifex)*			
446.	625	*Spinifex longifolius (Beach Spinifex)*			
447.	635	*Sporobolus virginicus (Marine Couch)*			
448.	636	*Stenotaphrum secundatum (Buffalo Grass)*	Y		
449.	11137	*Vulpia fasciculata*	Y		
450.	11018	*Vulpia muralis*	Y		
451.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
452.	12052	*Vulpia myuros forma megalura*	Y		
Polygalaceae					
453.	4552	*Comesperma confertum*			
454.	4555	*Comesperma integerrimum*			
Polyidaceae					
455.	27220	*Rhodopeltis australis*			
456.	27221	*Rhodopeltis borealis*			
Polyphysaceae					
457.	48409	*Acetabularia caliculus*			
Portulacaceae					
458.	2884	*Portulaca oleracea (Purslane, Wakati)*			
Posidoniaceae					
459.	123	*Posidonia australis (Fibreball Weed)*			
460.	105	*Posidonia coriacea*			
Potamogetonaceae					
461.	48620	*Althenia preissii*			
Pottiaceae					
462.	36219	*Pseudocrossidium hornschuchianum*			
463.	32438	*Syntrichia pagorum*			
464.	32455	*Weissia controversa*			
Primulaceae					
465.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
466.	6484	*Samolus repens (Creeping Brookweed)*			
Ranunculaceae					
467.	10804	*Clematis linearifolia*			
468.	2935	*Ranunculus pumilio (Smallflower Buttercup)*			
469.	11831	*Ranunculus pumilio var. politus*			

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Resedaceae					
470.	3083	*Reseda alba (White Mingnonette)*	Y		
471.	3085	*Reseda luteola (Wild Mingnonette)*	Y		
Rhamnaceae					
472.	4822	*Rhamnus alaternus (Buckthorn)*	Y		
473.	4828	*Spyridium globulosum (Basket Bush)*			
Rhodomelaceae					
474.	26440	*Acanthophora dendroides*			
475.	26454	*Amansia serrata*			
476.	26762	*Dictyomenia sonderi*			
477.	26793	*Ditria expleta*			
478.	26811	*Endosiphonia spinulosa*			
479.	26922	*Herposiphonia versicolor*			
480.	26945	*Holotrichia comosa*			
481.	26995	*Kuetzingia canaliculata*			
482.	26998	*Laurencia brongniartii*			
483.	48408	*Laurencia dendroidea*			
484.	27000	*Laurencia elata*			
485.	27001	*Laurencia filiformis*			
486.	27002	*Laurencia forsteri*			
487.	27018	*Leveillea jungermannioides*			
488.	27100	*Neurymenia fraxinifolia*			
489.	27162	*Pollexfenia pedicellata*			
490.	27170	*Polysiphonia australiensis*			
491.	29621	*Polysiphonia forfex*			
492.	27179	*Polysiphonia sertularioides*			
493.	27190	*Protokuetzingia australasica*			
494.	27335	*Tolypiocladia calodictyon*			
495.	27336	*Tolypiocladia glomerulata*			
496.	27360	*Vidalia spiralis*			
Rhodymeniaceae					
497.	26516	*Botryocladia leptopoda*			
498.	26518	*Botryocladia sonderi*			
499.	26614	*Chamaebotrys boergesenii*			Y
500.	26685	*Coelarthrum cliftonii*			
501.	26686	*Coelarthrum opuntia*			
502.	26864	*Gloiosaccion brownii*			
503.	48568	*Halopeltis australis*			
Rubiaceae					
504.	7323	*Galium murale (Small Goosegrass)*	Y		
Ruppiaceae					
505.	116	*Ruppia polycarpa*			
506.	117	*Ruppia tuberosa*			
Rutaceae					
507.	4403	*Boronia alata (Winged Boronia)*			
508.	4454	*Diplolaena dampieri (Southern Diplolaena)*			
Sapindaceae					
509.	4754	*Dodonaea aptera (Coast Hop-bush)*			
Sarcomeniaceae					
510.	27229	*Sarcomenia delesserioides*			
Schizymeniaceae					
511.	27144	*Platoma cyclocolpum*			
Scinaiaceae					
512.	27269	*Scinaia aborealis*			
513.	27270	*Scinaia tsinglanensis*			
Scrophulariaceae					
514.	7054	*Dischisma arenarium*	Y		
515.	7215	*Eremophila glabra (Tar Bush)*			
516.	17175	*Eremophila glabra subsp. albicans*			
517.	7289	*Myoporum caprarioides (Slender Myoporum)*			
518.	7291	*Myoporum insulare (Blueberry Tree, boobialla)*			
Sebdeniaceae					
519.	27274	*Sebdenia flabellata*			

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Siphonocladaceae					
520.	26769	*Dictyosphaeria cavernosa*			
521.	26770	*Dictyosphaeria sericea*			
522.	26771	*Dictyosphaeria versluysii*			
523.	27280	*Siphonocladus tropicus*			
Solanaceae					
524.	6968	*Lycium ferocissimum (African Boxthorn)*	Y		
525.	6974	*Nicotiana glauca (Tree Tobacco)*	Y		
526.	47173	*Solanum lycopersicum (Tomato)*	Y		
527.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
528.	7037	*Solanum symonii*			
Solieriaceae					
529.	48503	*Betaphycus speciosus*			
530.	27281	*Solieria robusta*			
Spongitaceae					
531.	27098	*Neogoniolithon brassica-florida*			
Stylidiaceae					
532.	30278	*Stylidium androsaceum*			
Tamaricaceae					
533.	15741	*Tamarix aphylla (Athel Tree)*	Y		
Typhaceae					
534.	99	*Typha orientalis (Bulrush, Cumbungi)*			
Udoteaceae					
535.	26528	*Callipsygma wilsonis*			Y
536.	26626	*Chlorodesmis baculifera*			Y
537.	27214	*Rhipiliopsis multiplex*			Y
538.	27215	*Rhipiliopsis peltata*			
Ulvaceae					
539.	35260	*Ulva compressa*			
540.	27352	*Ulva lactuca*			
541.	27354	*Ulva rigida*			
Urticaceae					
542.	12670	*Parietaria cardiostegia*			
543.	1762	*Parietaria debilis (Pellitory)*			
544.	1767	*Urtica urens (Small Nettle)*	Y		
Valoniaceae					
545.	27356	*Valonia macrophysa*			
Wrangeliaceae					
546.	26886	*Griffithsia teges*			
547.	35863	*Haloplegma duperreyi*			
548.	26900	*Haloplegma preissii*			
549.	27326	*Tanakaella itonoi*			
550.	27368	*Wrangelia plumosa*			
Zygophyllaceae					
551.	48887	*Roepera billardierei*			
552.	48901	*Roepera similis*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

Appendix B
PMST

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 29-Mar-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	43
Listed Migratory Species:	67

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	101
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	4
Key Ecological Features (Marine):	None
Biologically Important Areas:	14
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Pterodroma mollis Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
FISH			
Thunnus maccoyii Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
INSECT			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Hesperocolletes douglasi](#) Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Carcharias taurus (west coast population)			
Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area	In feature area
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Galeorhinus galeus			
School Shark, Eastern School Shark, Snapper Shark, Tope, Soupfin Shark [68453]	Conservation Dependent	Species or species habitat may occur within area	In buffer area only
Pristis pristis			
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna pacifica			
Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In feature area
Diomedea amsterdamensis			
Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea dabbenena			
Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area	In feature area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area	In feature area
Phoebetria fusca Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Migratory Marine Species			
Balaenoptera edeni			
Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus			
Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
Caperea marginata			
Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area
Carcharhinus longimanus			
Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias			
White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta			
Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat likely to occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Pristis pristis Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
[Calidris ferruginea](#) Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
[Calidris melanotos](#) Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
[Calidris ruficollis](#) Red-necked Stint [860]		Roosting known to occur within area	In feature area
[Calidris tenuirostris](#) Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
[Charadrius bicinctus](#) Double-banded Plover [895]		Roosting known to occur within area	In feature area
[Charadrius leschenaultii](#) Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area	In feature area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area	In feature area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea dabbenena Tristan Albatross [66471]	Endangered	Species or species habitat may occur within area	In buffer area only
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Halobaena caerulea Blue Petrel [1059]	Vulnerable	Species or species habitat may occur within area	In buffer area only

Scientific Name	Threatened Category	Presence Text	Buffer Status
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area	In feature area
Larus pacificus Pacific Gull [811]		Breeding known to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Onychoprion fuscatus as Sterna fuscata](#) Sooty Tern [90682]		Breeding known to occur within area	In feature area
[Pachyptila turtur](#) Fairy Prion [1066]		Species or species habitat known to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Breeding known to occur within area	In feature area
[Phaethon rubricauda](#) Red-tailed Tropicbird [994]		Breeding known to occur within area	In feature area
[Phalaropus lobatus](#) Red-necked Phalarope [838]		Roosting known to occur within area	In feature area
[Phoebetria fusca](#) Sooty Albatross [1075]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
[Pluvialis squatarola](#) Grey Plover [865]		Roosting known to occur within area overfly marine area	In feature area
[Pterodroma mollis](#) Soft-plumaged Petrel [1036]	Vulnerable	Species or species habitat may occur within area	In buffer area only
[Puffinus assimilis](#) Little Shearwater [59363]		Breeding known to occur within area	In feature area
[Recurvirostra novaehollandiae](#) Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area
[Rostratula australis as Rostratula benghalensis (sensu lato)](#) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Stercorarius skua as Catharacta skua Great Skua [823]		Species or species habitat may occur within area	In buffer area only
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In feature area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis Hooded Dotterel, Hooded Plover [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Tringa nebularia			
Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa stagnatilis			
Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
Tringa totanus			
Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area	In feature area
Xenus cinereus			
Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area	In feature area
Fish			
Acentronura australe			
Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
Campichthys galei			
Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
Choeroichthys suillus			
Pig-snouted Pipefish [66198]		Species or species habitat may occur within area	In buffer area only
Halicampus brocki			
Brock's Pipefish [66219]		Species or species habitat may occur within area	In buffer area only
Heraldia nocturna			
Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
Hippocampus angustus			
Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
Hippocampus breviceps			
Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Hippocampus subelongatus West Australian Seahorse [66722]		Species or species habitat may occur within area	In feature area
Histiogamphelus cristatus Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In feature area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
Syngnathoides biaculeatus Double-end Pipehorse, Double-ended Pipehorse, Alligator Pipefish [66279]		Species or species habitat may occur within area	In buffer area only
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
Reptile			
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Migration route known to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Foraging, feeding or related behaviour may occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Rottnest Island	State Reserve	WA	In feature area

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Rottnest Island Lakes	WA	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Rottnest Lodge Redevelopment	2019/8565	Not Controlled Action	Completed	In buffer area only
Seismic Survey, Bremer Basin, Mentelle Basin and Zeewyck Sub-basin	2004/1700	Not Controlled Action	Completed	In feature area
Not controlled action (particular manner)				
INDIGO Marine Cable Route Survey (INDIGO)	2017/7996	Not Controlled Action (Particular Manner)	Post-Approval	In buffer area only

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna carneipes Flesh-footed Shearwater [82404]	Aggregation	Known to occur	In feature area
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In feature area
Eudyptula minor Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In feature area
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In feature area
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Former Range	In feature area
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In feature area
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In feature area

Scientific Name	Behaviour	Presence	Buffer Status
Sterna dougallii Roseate Tern [817]	Foraging	Known to occur	In feature area
Sternula nereis Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In feature area
Seals			
Neophoca cinerea Australian Sea Lion [22]	Foraging (male)	Likely to occur	In feature area
Whales			
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Migration	Known to occur	In buffer area only
Eubalaena australis Southern Right Whale [40]	Calving buffer	Known to occur	In feature area
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix 2
of the RPS memo
which is also Appendix B of the 360 Environmental Report

FLORA AND VEGETATION SURVEY

SOUTH THOMSON AND KINGSTOWN, ROTTNEST ISLAND (WADJEMUP)

THE ROTTNEST ISLAND AUTHORITY

SEPTEMBER 2022

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EXECUTIVE SUMMARY

Focused Vision Consulting Pty Ltd (FVC) was commissioned by the Rottnest Island Authority (RIA) to undertake a flora and vegetation survey with particular emphasis on potential Threatened Ecological Communities and Threatened or Priority flora of Rottnest Island (Wadjemup) within the South Thompson and Kingstown areas.

The scope of work included a single-phase, detailed flora and vegetation survey during autumn, assessing three areas, with associated reporting and data delivery.

A single phase, detailed flora and vegetation field assessment was carried out in the study area by experienced botanists on 2 May 2022.

The key findings and conclusions arising from the flora and vegetation assessment within the study area were as follows:

- No Threatened flora listed under the *Biodiversity Conservation Act 2016* (BC Act) or the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) were recorded.
- No Priority species listed by the Department of Biodiversity, Conservation and Attractions (DBCA) were recorded.
- No weeds listed as Weeds of National Significance (WoNS) or Declared Pest (DP) plants under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) were recorded.
- The condition of the vegetation was found to range from 'Excellent' to 'Completely Degraded - Degraded' with the greatest proportion in 'Good' condition.
- Nine vegetation units and three other classifications (Beach, Planted and Cleared areas) were defined and mapped within the study area.
- Two of the recorded vegetation units were determined to be characteristic of the State-listed *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain Threatened Ecological Community (TEC) (*Callitris preissii - Melaleuca lanceolata* forests and woodlands TEC).
- The remaining extent of the one vegetation association supported by the study area falls below the 10% retention target in the context of the Swan Coastal Plain, and two vegetation associations relevant to the study area represented by less than 30% of pre-European extent across the Swan Coastal Plain and Perth IBRA sub-region.
- Vegetation units MlAp and CpMl are considered to be representative of the State-listed *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands TEC (FCT 30a), and therefore, these units are considered to be of State significance.
- Rottnest Island (Wadjemup) is an A Class Reserve and an ESA, therefore all vegetation it supports is considered to be of State and regional significance.
- Vegetation units MlAp, CpMl, TiSS, LpAl and SlG are representative of pre-European vegetation associations and/or complexes that have less than 30% of their original extent remaining and are therefore considered regionally significant.
- Vegetation units GtS, LpAp and SlG occur as small, isolated communities, and are therefore considered locally significant.
- Vegetation units CpMl and GtS are limited in their local extent and/or distribution, and are therefore, considered locally significant.
- Since *Lepidium puberulum* (Priority 4) has previously been recorded within the study area, and since this species would only be observable during late winter and spring, where clearing impacts may be proposed within areas of suitable habitat (sandy soils associated with limestone), further targeted surveys would be appropriate.

1 INTRODUCTION

The Rottnest Island Authority respects the Whadjuk people as the traditional custodians of Wadjemup (Rottnest Island).

1.1 BACKGROUND

Rottnest Island (Wadjemup) is governed by the *Rottnest Island Authority Act 1987* (RIA Act), which establishes the Rottnest Island Authority (RIA) as a statutory body to control and manage the island.

Focused Vision Consulting Pty Ltd (FVC) was commissioned by RIA for a targeted and reconnaissance flora and vegetation assessment, with particular emphasis on potential Threatened Ecological Communities (TECs) and Threatened or Priority flora within the South Thomson and Kingstown areas. The survey results may be utilised for future Environmental Impact Assessments (EIA) and were required to be conducted as per the *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a).

1.2 LOCATION

The study area is located within the South Thomson and Kingstown areas of Rottnest Island, which is located on an offshore island, approximately 18 kilometres (km) west of Fremantle. Rottnest Island (Wadjemup) is part of the City of Cockburn. The survey areas were separated into three, as shown in **Figure 1**, which are collectively referred to as the study area in this report.

1.3 SCOPE OF WORK

The scope of work required to be fulfilled for the study area was as follows:

- Flora and vegetation desktop assessment, in accordance with the *Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment* (Western Australian Environmental Protection Authority (EPA) 2016a)
- Undertake a survey, incorporating:
    - an autumn reconnaissance assessment in accordance EPA (2016a) across the full area extent/s to identify, describe and map general flora species, vegetation communities and vegetation condition
    - opportunistic targeted survey for Threatened and Priority flora
    - determination of the presence of potential Threatened Ecological Communities (TECs) and Priority Ecological Communities (PECs) and mapping of their extent, with a particular focus on Floristic Community Type (FCT) 30a
- Prepare a report that presents the desktop and field assessment findings, prepared in accordance with EPA (2016a)
- Preparation of an Index of Biodiversity Surveys for Assessment (IBSA)-compliant package of spatial data.

Figure 1 - Survey Areas

RIA22001 30 June 2022

2 LEGISLATIVE CONTEXT

The flora and vegetation assessment was conducted in accordance with the following legislation:

- Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)
- Western Australian *Environmental Protection Act 1986* (EP Act)
- Western Australian *Biodiversity Conservation Act 2016* (BC Act).

The assessment complied with the requirements for environmental survey and reporting in Western Australia, as outlined in:

- EPA (2008) *Guidance Statement No. 33: Environmental Guidance for Planning and Development*
- EPA (2016a) *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment*
- EPA (2016b) *Environmental Factor Guideline – Flora and Vegetation*.

Survey methodology guidance for targeted flora searches was also taken from:

- Commonwealth of Australia (2013) *Survey Guidelines for Australia's Threatened Orchids*.

2.1 THREATENED AND PRIORITY FLORA

The Department of Biodiversity, Conservation and Attractions (DBCA) assigns conservation status to endemic plant species that are geographically restricted to few known populations or threatened by local processes. Allocating conservation status to plant species assists in protecting populations and conserving species from potential threats (DBCA 2019).

The BC Act provides a statutory basis for the listing of threatened ecological communities (TECs), threatened and specially protected species, critical habitat and key threatening processes. Whilst not awarded any statutory protection, the DBCA maintains the Priority flora list, for species of conservation concern. Therefore, both Threatened and Priority flora are important focuses of flora and vegetation surveys and their definitions are presented in **Table 1**.

Table 1 - Definitions of Threatened and Priority Flora Species (DBCA 2019)

Conservation Code	Category
T	**Threatened Species** Listed by order of the Minister as Threatened in the category of critically endangered, endangered or vulnerable under section 19(1), or is a rediscovered species to be regarded as threatened species under section 26(2) of the BC Act. Threatened flora is that subset of 'Rare Flora' listed under schedules 1 to 3 of the Wildlife Conservation (Rare Flora) Notice for Threatened Flora.
P1	**Priority 1 – Poorly Known Species** Species that are known from one or a few locations (generally five or less) which are potentially at risk. All occurrences are either: very small; or on lands not managed for conservation, e.g. agricultural or pastoral lands, urban areas, road and rail reserves, gravel reserves and active mineral leases; or otherwise under threat of habitat destruction or degradation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under immediate threat from known threatening processes. Such species are in urgent need of further survey.
P2	**Priority 2 – Poorly Known Species** Species that are known from one or a few locations (generally five or less), some of which are on lands managed primarily for nature conservation, e.g. national parks, conservation parks, nature reserves and other lands with secure tenure being managed for conservation. Species may be included if they are comparatively well known from one or more locations but do not meet adequacy of survey requirements and appear to be under threat from known threatening processes. Such species are in urgent need of further survey.
P3	**Priority 3 – Poorly Known Species** Species that are known from several locations, and the species does not appear to be under imminent threat, or from few but widespread locations with either large population size or significant remaining areas of apparently suitable habitat, much of it not under imminent threat. Species may be included if they are comparatively well known from several locations but do not meet adequacy of survey requirements and known threatening processes exist that could affect them. Such species are in need of further survey.
P4	**Priority 4 – Rare, Near Threatened and other species in need of monitoring** (a) Rare. Species that are considered to have been adequately surveyed, or for which sufficient knowledge is available, and that are considered not currently threatened or in need of special protection but could be if present circumstances change. These species are usually represented on conservation lands. (b) Near Threatened. Species that are considered to have been adequately surveyed and that are close to qualifying for Vulnerable but are not listed as Conservation Dependent. (c) Species that have been removed from the list of threatened species during the past five years for reasons other than taxonomy.

Under the EPBC Act, actions that have, or are likely to have, a significant impact on a matter of national environmental significance (MNES) require approval from the Federal Minister for the Environment. Species at risk of extinction are recognised as Threatened at a Commonwealth level and are categorised according to the EPBC Act as summarised in **Table 2**.

Table 2 - Categories of EPBC Act Threatened Flora Species

Conservation Code	Category
EX	**Extinct** Species where "there is no reasonable doubt that the last member of the species has died", and listing is otherwise in accordance with the ministerial guidelines (section 24 of the BC Act).
EW	**Extinct in the Wild** Species that "is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; and it has not been recorded in its known habitat or expected habitat, at appropriate seasons, anywhere in its past range, despite surveys over a time frame appropriate to its life cycle and form", and listing is otherwise in accordance with the ministerial guidelines (section 25 of the BC Act). Currently there are no threatened fauna or threatened flora species listed as extinct in the wild. If listing of a species as extinct in the wild occurs, then a schedule will be added to the applicable notice.
CR	**Critically Endangered** Threatened species considered to be "facing an extremely high risk of extinction in the wild in the immediate future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as critically endangered under section 19(1)(a) of the BC Act in accordance with the criteria set out in section 20 and the ministerial guidelines. Published under schedule 1 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for critically endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for critically endangered flora.
EN	**Endangered** Threatened species considered to be "facing a very high risk of extinction in the wild in the near future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as endangered under section 19(1)(b) of the BC Act in accordance with the criteria set out in section 21 and the ministerial guidelines. Published under schedule 2 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for endangered fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for endangered flora.
VU	**Vulnerable** Threatened species considered to be "facing a high risk of extinction in the wild in the medium-term future, as determined in accordance with criteria set out in the ministerial guidelines". Listed as vulnerable under section 19(1)(c) of the BC Act in accordance with the criteria set out in section 22 and the ministerial guidelines. Published under schedule 3 of the Wildlife Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the Wildlife Conservation (Rare Flora) Notice 2018 for vulnerable flora.

Any species listed in State and Commonwealth legislation as being of conservation significance is broadly considered to be a significant species. This incorporates species that are endangered, vulnerable and rare or covered by international conventions. Significance is not limited to species covered by State and Commonwealth legislation that also includes species of local significance and species showing significant range extensions or at the edge of their known range.

2.2 THREATENED AND PRIORITY ECOLOGICAL COMMUNITIES

TECs are naturally occurring biological assemblages that occur in a particular type of habitat, which are subject to processes that threaten to destroy or significantly modify the assemblage across its range (DEC 2007).

The Minister may list an ecological community as a TEC in one of the following categories: Presumed Totally Destroyed (PD), Critically Endangered (CR), Endangered (EN) or Vulnerable (VU). A publicly available database, listing TECs within Western Australia (WA) is maintained by DBCA.

TECs in WA are protected under the State BC Act and some are also protected under the Commonwealth EPBC Act. The TECs on the Commonwealth register are also listed on the Department of Climate Change, Energy, the Environment and Water (DCCEEW) website, and in the Protected Matters Database (DCCEEW 2022a, 2022b).

Additional to TECs, ecological communities that are considered to be potentially of conservation significance (and potentially TECs) that do not currently meet survey criteria or that are not adequately defined, are rare but not threatened, have been recently removed from the TEC list or require regular monitoring, are considered to be Priority Ecological Communities (PECs) (DEC 2013) and are also required to be taken into consideration during environmental impact assessments (EPA 2016b).

2.3 VEGETATION OF SIGNIFICANCE

Alongside and in addition to significance according to statutory listings, vegetation may be considered significant at a National, State, regional or local level. Whilst not applicable to statutory protection, vegetation significance is an important consideration in the environmental impact assessment process.

2.3.1 Nationally Significant Vegetation

Vegetation communities may be considered to be of National significance where they support the following Commonwealth listed Matters of National Environmental Significance (MNES):

- Populations of Threatened (EPBC listed) species
- TECs listed as nationally (EPBC) significant
- RAMSAR Wetlands of International Importance (DCCEEW 2022a).

2.3.2 State Significant Vegetation

Vegetation communities may be considered to be of State significance where they:

- Support State listed Threatened flora, fauna and TECs afforded protection under the BC Act (EPA 2008, WALGA 2004)
- Occur within the State-managed conservation estate (areas protected under the *Conservation and Land Management Act 1984* (CLM Act)) or areas that have been formally recommended by DBCA for inclusion in the State conservation estate (EPA 2008).

2.3.3 Regionally Significant Vegetation

Vegetation communities may be considered to be of regional significance where they:

- Support populations of Priority Flora or ecological communities (EPA 2016b, Government of Western Australia 2000a)
- Are formally protected or recognised as Environmentally Sensitive Areas (ESAs), or under planning schemes for conservation, such as Bush Forever (EPA 2008, WALGA 2004)
- Support conservation category wetlands including associated vegetation (Government of Western Australia 2000a)
- Maintain important ecological processes (EPA 2016b)
- Contain flora species exhibiting range extensions and undescribed species (EPA 2016b)
- Have a restricted regional distribution (EPA 2016b)
- Are represented by less than 30% of their pre-European extent (Commonwealth of Australia 2001).

2.3.4 Locally Significant Vegetation

Vegetation communities may be considered to be locally significant where they:

- Occur as small, isolated communities (Government of Western Australia 2000b, WALGA 2004)
- Have a restricted local extent (proportion) (EPA 2016b) and/or are locally restricted to only one or a few locations (WALGA 2004).

2.4 VEGETATION CLEARING, EXTENT AND STATUS

Clearing of native vegetation is regulated in WA under the EP Act and the *Environmental Protection (Clearing of Native Vegetation) Regulations 2004*. Any clearing of native vegetation is an offence, unless carried out under a clearing permit or if the clearing is for an exempt purpose (Department of Water and Environmental Regulation (DWER 2022). A clearing permit may be required under Part V of the EP Act, whereby permit applications to clear native vegetation must be assessed against the '10 Clearing Principles' as outlined in the regulations (DER 2019).

Where clearing of native vegetation is proposed to occur, there are several key criteria applied to the assessment of clearing permit applications, in the interests of biodiversity conservation (DER 2019).

The objective of the EPA in relation to flora and vegetation is 'to protect flora and vegetation so that biological diversity and ecological integrity are maintained' (EPA 2016a). This objective is documented in the EPA Factor Guideline - Flora and Vegetation (EPA 2016a). The EPA considers it is important that ecological communities are maintained above the threshold level of 30% of the original pre-clearing extent of the community in unconstrained areas and 10% within 'constrained' areas (EPA 2008).

2.5 ENVIRONMENTALLY SENSITIVE AREAS

Environmentally Sensitive Areas (ESAs) are areas that require special protection due to aspects such as landscape, fauna or historical value and are generally considered to be areas of high conservation value. ESAs are declared in the *Environmental Protection (Environmentally Sensitive Areas) Notice 2005*, which was gazetted on 8 April 2005 (Minister for the Environment 2005).

There are several types of ESAs relating to flora and vegetation, declared under Part V of the EP Act, which include:

- a defined wetland and the area within 50 m of that wetland
- the area covered by vegetation within 50 m of rare (Threatened) flora, to the extent where the vegetation is continuous with the vegetation in which the rare (Threatened) flora is located
- the area covered by a TEC
- Bush Forever sites.

2.6 INTRODUCED FLORA

Over 1,200 introduced (weed) species have been recognised to occur within Western Australia (EPA 2007). Weeds are plants that are not indigenous to an area and have been introduced either directly or indirectly through human activity. They establish in natural ecosystems and adversely modify natural processes, have the potential to dominate and simplify the ecosystems and thus decrease habitat value provided for native fauna. Weeds pose a threat to many native flora species due to their ability to rapidly grow and out-compete for available water, space, sunlight, and nutrients (EPA 2007).

2.6.1 Weeds of National Significance

Under the Australian Weed Strategy 2017-2027, there are currently 32 weed species listed as Weeds of National Significance (WoNS) (Commonwealth of Australia 2017). Each weed listed was considered for inclusion based on the following criteria:

- invasive tendencies
- impacts
- potential for spread
- socioeconomic and environmental values.

2.6.2 Declared Pest Plants

The Western Australian Organism List (WAOL) details organisms listed as Declared Pests, including pest plants, under the *Biosecurity and Agriculture Management Act 2007* (BAM Act) (Department of Primary Industries and Regional Development (DPIRD 2022)). Under the BAM Act, Declared Pests are listed under one of the following categories:

- **C1 (exclusion)**, that applies to pests not established in Western Australia; control measures are to be taken to prevent their entry and establishment
- **C2 (eradication)**, that applies to pests that are present in Western Australia but in low numbers or in limited areas where eradication is still a possibility
- **C3 (management)**, that applies to plants that should have some form of management applied that will alleviate the harmful impacts of the plant, reduce the numbers or distribution of the plant, or prevent or contain the spread of the plant (DPIRD 2017).

2.6.3 Environmental Weeds

Introduced species have also been ranked by a number of attributes, including invasiveness, distribution and environmental impacts in the various regions in the *Environmental Weed Strategy* (Department of Conservation and Land Management (CALM) 1999). To advance the above categorisation, the Invasive Plant Prioritisation Process for DBCA was developed in 2008 (DPAW 2013).

3 EXISTING ENVIRONMENT

3.1 CLIMATE

Rottnest Island (Wadjemup) has a temperate Mediterranean climate which is characterised by mild dry, warm summers and moderate seasonality. Rottnest Island (Site Number 009193) is one of the Bureau of Meteorology (BoM) meteorological recording stations, located approximately 4.5 km from the study area and which has been recording since 1983. The site has recorded an average annual rainfall of 567.7 mm and annual mean maximum temperatures ranging from 17.8°C in winter to 27.3°C in summer (BoM 2022) (**Figure 2**). The summer months preceding the field survey (January to March 2022), were recorded to be hotter and drier than the long-term average; however, the month prior to field survey (April) experienced average temperatures and 23.6 mm more rain than the monthly average (**Figure 2**).

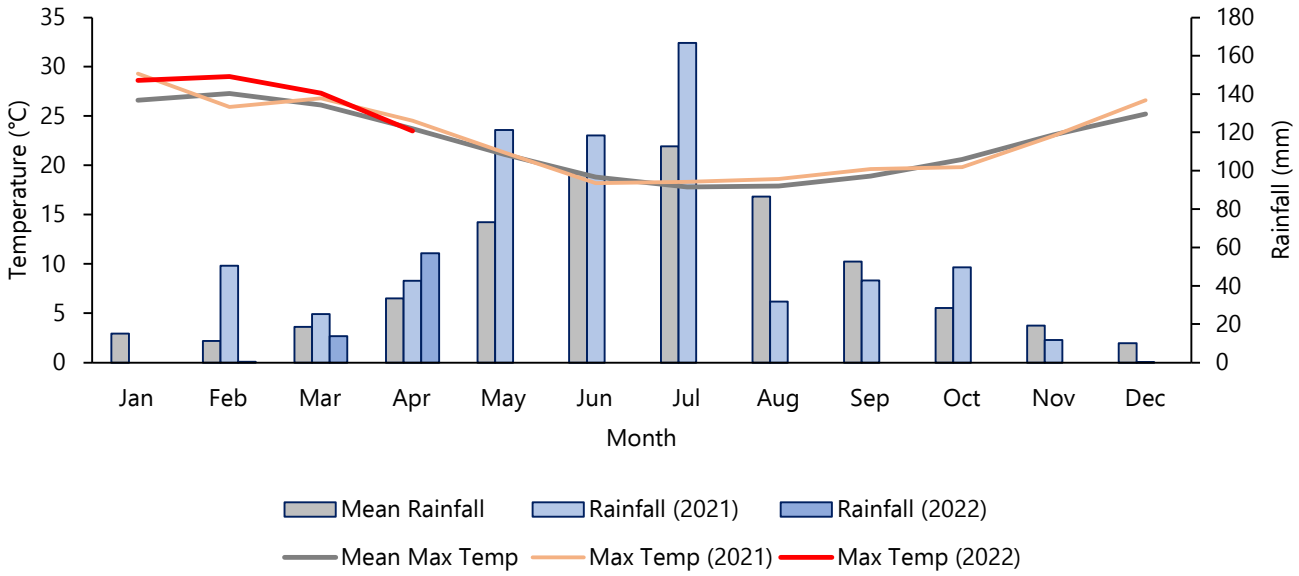

Figure 2 - Climate Data for Perth Metro Weather Station (009193) (BoM 2022)

3.2 IBRA REGION

There are 89 recognised Interim Biogeographic Regionalisation for Australia (IBRA) regions across Australia that have been defined based on climate, geology, landforms and characteristic vegetation and fauna (DCCEEW 2022c). The study area lies within the Swan Coastal Plain (SWA) IBRA region and, at a finer scale, within the Perth subregion (SWA2) (Mitchell *et al.* 2002).

The Swan Coastal Plain bioregion is a low lying coastal plain, mainly covered with Banksia and Tuart (*Eucalyptus gomphocephala*) woodlands on sandy soils. The Perth subregion is composed of colluvial and aeolian sands, alluvial river flats, coastal limestone, as well as heath and/or Tuart woodlands on limestone, Banksia and Jarrah (*Eucalyptus marginata*) - Banksia woodlands on Quaternary marine dunes of various ages, Marri (*Corymbia calophylla*) on colluvial and alluvials (Mitchell *et al.* 2002).

3.3 SOILS

The Swan Coastal Plain supports five major geomorphological systems (landforms) that lie parallel to the coast. From west to east these five systems include; the Quindalup Dunes, Spearwood Dunes, Bassendean Dunes, Pinjarra Plain and Ridge Hill Shelf (Churchward and McArthur 1980; Gibson *et al.* 1994). The study area is situated on the Quindalup South System (211Qu) and developed from Tamala Limestone (Playford 1988) (**Table 3**). The spatial extent of this system is presented in **Figure 3**.

Table 3 - Summary of Soil Systems within the Study Area (Schoknecht *et al.* 2004)

System	Soil Unit	Description
Quindalup South System	211Qu	Coastal dunes, of the Swan Coastal Plain, with calcareous deep sands and yellow sands. Vegetation consists of coastal scrub.

Figure 3 - Soils

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3.4 VEGETATION

The study area is located on the Swan Coastal Plain and has been broadly characterised by Beard (1990). The Beard vegetation associations supported by the study area and the remaining extent across a range of contexts are presented in **Table 4** and spatially in **Figure 4**.

Table 4 - Pre-European Vegetation of the Study Area (Beard 1990, DBCA 2018)

Extent Context	Vegetation System Association	Broad Vegetation Description	Pre-European Extent (Ha)	Current Extent (ha)	Pre-European Extent Remaining (%)	Current Extent in DBCA Managed Lands (%)
Western Australia	15	Low forest; cypress pine	2,374.16	1,576.52	66.40	37.34
	125	Bare areas; salt lakes	3,485,785.49	3,146,487.22	90.27	7.62
	1007	Mosaic Shrublands: *Acacia lasiocarpa* and *Melaleuca acerosa* Heath / *Acacia rostellifera* and *Acacia cyclops* thicket	30,407.75	20,691.11	68.05	10.04
Swan Coastal Plain IBRA Region	15	Low forest; cypress pine	17,364.58	3,150.77	18.14	2.11
	125	Bare areas; salt lakes	136,188.20	9,017.32	6.62	1.43
	1007	Mosaic Shrublands: *Acacia lasiocarpa* and *Melaleuca acerosa* Heath / *Acacia rostellifera* and *Acacia cyclops* thicket	30,109.89	20,679.62	68.68	10.13
Perth IBRA Subregion	15	Low forest; cypress pine	1,977.93	1,564.26	79.09	44.66
	125	Bare areas; salt lakes	9,401.12	1,948.17	20.72	11.70
	1007	Mosaic Shrublands: *Acacia lasiocarpa* and *Melaleuca acerosa* Heath / *Acacia rostellifera* and *Acacia cyclops* thicket	30,109.89	20,679.62	68.68	10.13
City of Cockburn	15	Low forest; cypress pine	1,353.14	886.49	65.51	65.51
	125	Bare areas; salt lakes	166.17	53.27	32.06	29.66
	1007	Mosaic Shrublands: *Acacia lasiocarpa* and *Melaleuca acerosa* Heath / *Acacia rostellifera* and *Acacia cyclops* thicket	337.86	271.35	80.32	80.32

Cells highlighted grey indicate vegetation associations with less than 30% extent remaining
Cell highlighted yellow indicates vegetation association with less than 10% extent remaining

Vegetation complexes within the study area have also been defined by Heddle *et al.* (1980) and are based on vegetation in association with landforms and underlying geology. Only the Quindalup Complex occurs within the study area and this complex is described as coastal dune consisting of two alliances; the strand and fore-dune alliance and the mobile and stable dune alliance. Local variations include the low, closed forest of *Melaleuca lanceolata* (Rottnest Teatree) - *Callitris preissii* (Rottnest Island Pine), the closed scrub of *Acacia rostellifera* (Summer-scented Wattle) and the low, closed *Agonis flexuosa* (Peppermint) forest of Geographe Bay. The pre-European extent and current known extent of this complex is listed in **Table 5**.

Table 5 –Vegetation Complexes Within the Study Area (Heddle *et al.* 1980)

Extent Context	Vegetation Complex	Pre-European Extent (Ha)	Current Extent (ha)	Pre-European Extent Remaining (%)	Current Extent in DBCA Managed Lands (%)
Swan Coastal Plain	Quindalup Complex	54,573.87	33,011.64	60.49	10.98
City of Cockburn	Quindalup Complex	1,021.62	728.23	71.28	1.87

The objective of the EPA in relation to flora and vegetation is: *To protect flora and vegetation so that biological diversity and ecological integrity are maintained* (EPA 2016a). The EPA considers it is important that vegetation associations are maintained above a threshold level of 30% for unconstrained areas and 10% for constrained areas (which includes the Perth metropolitan area), of the original pre-clearing extent of each association (EPA 2008). A level of 30% pre-clearing extent is considered to be the level below which species loss appears to accelerate exponentially at the ecosystem level (EPA 2008).

The following key criteria are applied to vegetation clearing from a biodiversity perspective, which justifies the retention targets (EPA 2000):

- The 'threshold level' below which species loss appears to accelerate exponentially within an ecosystem level, is regarded as being at a level of 30% (of the pre-European, i.e. pre-1750 extent of the vegetation type).
- A level of 10% of the original extent of a vegetation community is regarded as being a level representing Endangered.
- Clearing which would increase the threat level to a vegetation community should be avoided.

The remaining extent of all three Beard (1990) vegetation associations exceed the 30% threshold within Western Australia (**Table 4**). Within the Swan Coastal Plain IBRA region; vegetation associations 15 (Low forest; cypress pine) and 125 (Bare area; salt lakes) have remaining extents of 18.14% and 6.62%, respectively. This indicating that both associations fall below the 30% threshold and vegetation association 125 also falling below the 10% threshold. Within the Perth IBRA subregion, vegetation association 125 exhibits a remaining extent of 20.72%, not meeting the 30% threshold.

The remaining extent for the Heddle *et al.* (1980) Quindalup complex exceeds 30% threshold for the Swan Coastal Plain IBRA region and City of Cockburn extents (**Table 5**).

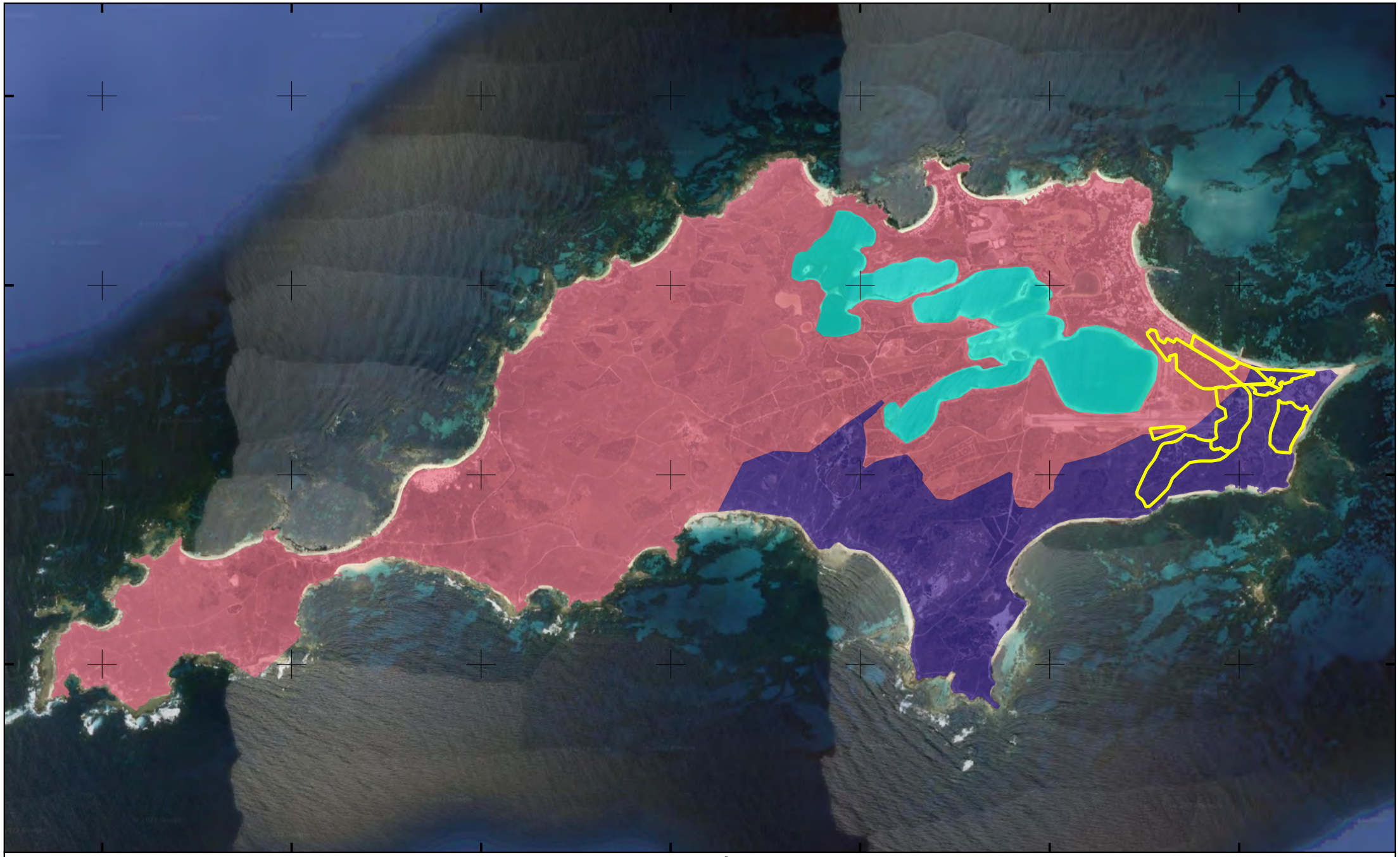

Figure 4 - Pre-European Vegetation

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4 METHODOLOGY

4.1 DESKTOP REVIEW

The desktop assessment consisted of database searches for significant flora and ecological communities based on a central point within the study area (115°32'49.9" E, 32°00'18.9" S) with a 5 km buffer, hereafter referred to as the desktop assessment area. Database searches included the DBCA Threatened and Priority flora records (DBCA 2022a), NatureMap (DBCA 2022b) (**Appendix A**), the Commonwealth DCCEEW Protected Matters Search Tool (PMST) (DCCEEW 2022b) for Matters of National Environmental Significance (MNES) (**Appendix B**) and the DBCA Threatened and Priority Ecological Communities records (DBCA 2021c).

The database search results were compiled into a table that concluded the likelihood of occurrence of each of the significant species and communities based on habitat preferences of known recorded locations for each species. The likelihood of all significant flora occurring within the study area was assessed based on known records and their age (currency) and proximity to the study area, and the presence of suitable habitat within the study area. Based on this assessment, each species was given a likelihood of occurrence category of 'likely' to occur, 'may occur' or 'unlikely' to occur. Where recent records and suitable species habitat occurs within or near the study area, these species were given a category of 'likely to occur', whilst species occurring a greater distance from the study area with limited suitable habitat, or for very old records, a category of 'unlikely to occur' or 'may occur' was applied, depending on record relevance.

4.2 FIELD ASSESSMENT

A reconnaissance flora and vegetation field assessment was carried out within the study area on 2 May 2022, by Principal Ecologist, Kellie Bauer-Simpson and Senior Botanist, Lisa Chappell, in accordance with EPA (2016a).

Within areas that were considered to potentially be representative of TECs or PECs, a targeted survey was carried out via the sampling of quadrats. During sampling, a temporary peg was installed to mark the north-west corner while marking out quadrats within measuring tapes, and when sampling was complete, the peg was removed. Quadrat dimensions were 10 m x 10 m in accordance with the Technical Guidance (EPA 2016a). Detailed data collection points (relevés) were recorded where vegetation was not considered to be a TEC or PEC and to inform vegetation mapping. During the survey vegetation, data from five quadrats and seven relevés were recorded, with their location visually represented in **Figure 5**.

The following information was collected at each quadrat and relevé:

- observer
- date
- GPS location (MGA94)
- representative photograph
- soil type and colour
- topography
- vegetation condition/degradation/disturbances (e.g. grazing, weed invasion, fire)
- flora species observed, including average height and projected foliage cover of dominant species within each stratum
- vegetation community, described in accordance with Level 5 of the National Vegetation Information System (NVIS) (DEH 2003)
- vegetation condition, assessed against the currently accepted scale; an adaptation of the Keighery (1994) condition scale.

Selective targeted searching for Threatened and Priority flora was carried out while traversing the study area and track logs of all personnel were captured using GPS-enabled devices to demonstrate survey effort. These combined track logs for the study area are presented in **Figure 6**.

The flora and vegetation data collected during assessment, from the combination of quadrats, relevés and continuous opportunistic observations, contributed to the flora inventory for the study area. The vegetation units of the study area have been defined by data collected within quadrats and relevés and opportunistically between, and how they relate to other environmental features such as soil type and landform. A map of the vegetation units was then developed using GIS and is presented in **Section 5.2.2**.

Vegetation condition was assessed using the current bushland condition scale, which is an adaptation of Keighery (1994) scale, as described in EPA (2016a).

All field data was recorded using electronic tablets equipped with the mobile mapping software, Mappt™ and customised data collection forms, tailored to the electronic collection of quadrat data and targeted flora surveys. Draft vegetation unit and condition mapping were also prepared in shapefiles directly into Mappt™ whilst in the field, and this formed the basis of the mapping presented in this report and provided in spatial data.

Quadrat data was then subject to floristic analysis to detect similar vegetation within the study area and also in comparison to relevant reference data (Gibson *et al.* 1994 and Keighery *et al.* 2012), in order to infer FCTs. The floristic analysis was first carried out for all quadrats sampled (batch analysis) and then for each quadrat individually (single site insertion (SSI)).

Figure 5 - Quadrat and Relevé Locations

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Figure 6 - Targeted Flora Search Traverses

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4.3 SURVEY LIMITATIONS

The current assessment was assessed against limitations imposed by many variables as outlined in the *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (EPA 2016a) (**Table 6)**.

Table 6 – Potential Survey Limitations and Constraints

Aspect	Constraint?	Commentary
Availability of regional data, previously available information	No	A wealth of data, literature and other information is available for sites within the Perth metropolitan area, such as the study area. DBCA database search results are evidence of the high volume of records that exist for the study area and surrounds.
Scope (detail)	No	A single-phase, detailed flora and vegetation assessment was carried out in accordance with EPA (2016a). The EPA Guidelines state that a minimum of three quadrats should be sampled in each vegetation unit considered to be of 'Good' or better condition. Three quadrats were sampled within vegetation in 'Good' or better condition and five relevé were sampled in an area of 'Degraded' or lower vegetation. This level of survey detail was more than adequate for the assessment of floristic values.
Competency/Experience of personnel	No	All of the personnel undertaking the field assessment, flora identifications, data analysis, vegetation mapping and reporting are experienced botanists, with specialist skills in their respective fields. All botanists have a minimum of 14 years' experience with a significant proportion of which have been on the Swan Coastal Plain.
Survey effort/detail/intensity	No	The single-phase, detailed flora and vegetation assessment was considered adequate to determine the floristic values within the study area. Three quadrats were sampled within vegetation in 'Good' or better condition and five relevés were sampled in an area of 'Degraded' or lower vegetation. All quadrats and relevés were sampled during May 2022.
Seasonal timing and climatic conditions	Yes	The flora and vegetation field assessment was not conducted during the optimal spring season for biological surveys on the Swan Coastal Plain. Some annual species are less likely to be present outside their optimal survey period. In the months preceding the May field assessment, February (particularly) and March experienced drier and hotter seasonal conditions than average; however, April experienced 4 mm more rainfall than the average. These conditions, although variable from long-term averages, are generally representative of the Perth Metropolitan summer / autumn climatic conditions.
Access	No	The entire study area was mostly easily accessible on foot (except where extremely dense) and was traversed in relatively good detail during May 2022.
Mapping reliability	No	The mapping has been prepared at a scale based on ground-truthed areas, with limited extrapolation given the good accessibility of the study area. Therefore, mapping reliability is considered high.
Disturbances	No	Numerous tracks bisect the study area, which have high foot and bicycle traffic, plus some vehicular access on suitable tracks. The disturbances are considered to be a minor constraint for the survey. Due to the degraded condition of some sections of the study area, one of the vegetation units was only able to be sampled with three quadrats.
Survey completeness	No	Most areas were easily accessible and data and other information for the regional is abundant. The field surveys for the current study were all able to be completed for the entire study area and in thorough detail.

5 RESULTS AND DISCUSSION

5.1 DESKTOP ASSESSMENT

5.1.1 Threatened and Priority Flora

The DBCA database search (incorporating Western Australian Herbarium (WAH) records), NatureMap Species Report and the DCCEEW PMST conducted for the study area determined that five species of Threatened and Priority flora that have the potential to occur within a 10 km radius of the study area (**Table 7**). The list of conservation significant species comprised one Commonwealth and State-listed Vulnerable (Threatened) flora, two Priority (P) 1 and two Priority 4 species, and all are annual or short-lived perennial species, emerging and flowering in spring.

Of these five species, four have been previously recorded on Rottnest Island, and have previous known locations within the study area or within 3 km (**Figure 7**). One species, *Lepidium puberulum* (P4) has been previously recorded within the study area and has therefore been determined to be 'likely' to occur. The remaining three species that have been previously recorded on the island were determined to 'possibly' occur, and the fifth species, not known to occur on the island, was determined to be 'unlikely' to occur.

Table 7 - Threatened and Priority Flora with the Potential to occur within the Study Area

Species	EPBC Act Conservation Status	BC Act/DBCA Conservation Status	Description	Preferred Habitat	Likelihood of Occurrence	Source of Record
Diuris micrantha	Vulnerable	Vulnerable	Tuberous, perennial orchid growing to 0.3-0.6 m high with a basal tuft of narrow, linear leaves. Produces up to 7 yellow flowers with red-brown markings from August to October.	Brown/black sandy clay-loam and clayey soils. Winter-wet depressions and swamps, in shallow water.	**Unlikely**. Four previous records approx. 38 km SE of the study area, on the mainland.	PMST
Lachnagrostis nesomytica subsp. *nesomytica*		Priority 1	Loosely tufted, annual or short-lived perennial grass growing to 0.2 m high. Produces purple-green flowers known from November (likely longer period).	Peat and loam soils. Edges of salt lakes, marshes and drainage areas.	**Possible**. Two previous records in possibly similar habitat within 2.8 km, W of the study area.	DBCA, NatureMap
Lachnagrostis nesomytica subsp. *pseudofiliformis*		Priority 1	Loosely tufted, annual or short-lived perennial grass growing to 0.3-0.5 m high. Produces purple-green flowers, flowering period unknown.	Grey-brown sand, peaty soils. Coastal areas, edges of saline lakes on Garden Island.	**Possible**. Three previous records in likely similar habitat 700 m to 1.7 km W of the study area.	DBCA, NatureMap
Lepidium puberulum		Priority 4	Erect annual herb growing to 0.4 m high. Produces greenish white flowers from July to November.	Sandy soil. Coastal areas, islands, often associated with limestone.	**Likely**. One previous record within the study area.	DBCA, NatureMap
Myosotis australis		Priority 4	Erect to procumbent annual herb growing to 0.3 m high. Produces blue-white flowers from August to November.	Sandy soil. Coastal dunes and swales often associated with limestone.	**Possible**. Two previous records within 1.7 km SW from the study area is possibly similar habitat.	DBCA/WAH, NatureMap

Figure 7 - DBCA Priority Flora

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5.1.2 Threatened and Priority Ecological Communities

A review of DBCA's Threatened and Priority Ecological Communities (TEC and PEC) database and the EPBC Protected Matters Search Tool identified that one TEC and six PECs occur within a 5 km buffer of the study area (DBCA 2022c, DCCEEW 2022b) (**Table 8**). Of these, five are Microbial communities and are not of conservation-significance due to flora and vegetation values, therefore, these communities are not discussed further in this report. The known extent of the two floristic communities of relevance to flora and vegetation values, SCP 30a and SCP 29a, are presented in **Figure 8**.

Table 8 – Threatened and Priority Ecological Communities Occurring within the Study Area

Abbreviated Identifier	Community Name	Commonwealth Category	State Category
Floristic Communities			
SCP 30a	*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain (FCT 30a (Gibson *et al.* 1994)	-	Vulnerable
SCP29a	Coastal shrublands on shallow sands	-	Priority 3
Microbial Communities			
Rottnest Island Microbial - Garden	Microbialites and microbial mats of coastal hypersaline lakes (Rottnest Island). Community 5 - Garden Lake	-	Priority 1
Rottnest Island Microbial - Serpentine	Rottnest Island Microbial Lake community 1 - Serpentine Lake	-	Priority 1
Rottnest Island Microbial - Herschel	Microbialites and microbial mats of coastal hypersaline lakes (Rottnest Island). Community 6 - Herschel Lake	-	Priority 1
Rottnest Island Microbial - Baghdad	Microbialites and microbial mats of coastal hypersaline lakes (Rottnest Island); Lake Baghdad	-	Priority 1
Government House Lake Microbial	Hypersaline microbial community 1 (Government House Lake, Rottnest)	-	Priority 2

5.1.2.1 *SCP 30a – Rottnest Island Pine (Callitris preissii) and Tea Tree (Melaleuca lanceolata) TEC*

The Rottnest Island Pine (*Callitris preissii*) and Tea Tree (*Melaleuca lanceolata*) TEC (Rottnest Island Pine and Tea Tree TEC) is listed as 'Vulnerable' under State legislation and is described as a woodland and forest community dominated by *Callitris preissii*, *Melaleuca lanceolata*, *Spyridium globulosum*, *Acanthocarpus preissii*, *Rhagodia baccata*, *Austrostipa flavescens* and *Trachymene pilosa* (Gibson *et al.* 1994). The critical habitat for the Rottnest Island Pine and Tea Tree TEC includes the dunes and swale habitat on which they occur, the fresh superficial groundwater that is likely to provide water to the trees in the community, and the catchment for this groundwater (DPaW 2014).

5.1.2.2 *SCP 29a – Coastal Shrublands on Shallow Sands*

SCP 29a (Coastal Shrublands on Shallow Sands) supports shrublands on shallow sands over limestone, in close proximity to the coast, on the southern Swan Coastal Plain. Landforms are dunes from Supergroup 4; uplands centred on Spearwood and Quindalup Dunes (Gibson *et al.* 1994). Key species include *Spyridium globulosum, Rhagodia baccata* and *Olearia axillaris* (DBCA 2022c).

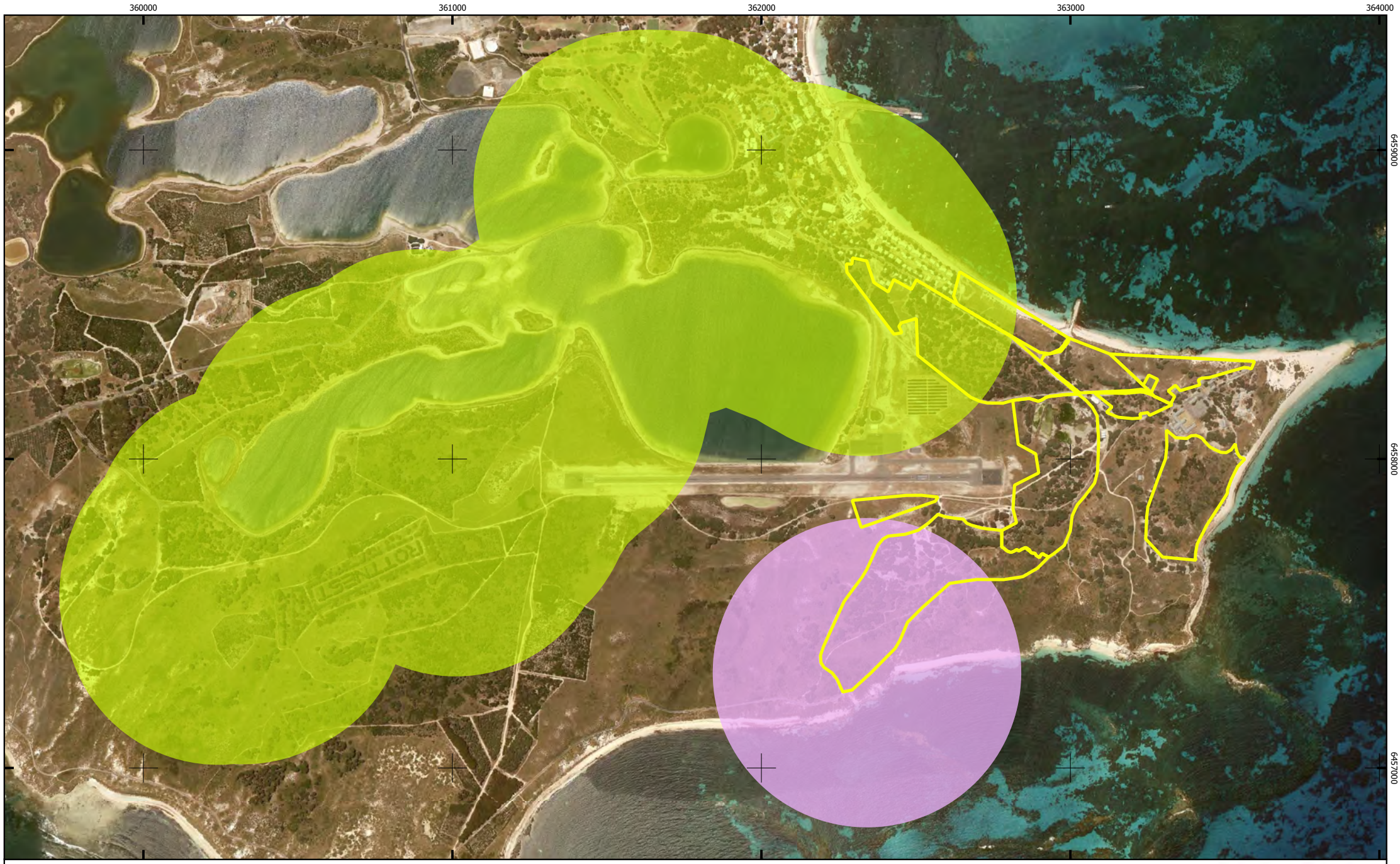

Figure 8 - Threatened and Priority Ecological Communities

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5.2 FIELD ASSESSMENT

5.2.1 Flora

A total of 26 flora taxa, from 25 genera and 15 families was recorded during the field survey. The dominant families were found to be Poaceae (five taxa), Myrtaceae (three taxa) and Cyperaceae (three taxa). The total includes 21 (80.77%) native species and five (19.23%) introduced (weed) species. The average species richness within quadrats was 5.6 species. Four species were recorded in 50% or more of the sample sites (quadrats and relevés), indicating a greater dominance and distribution compared to other species. These species were:

- *Acanthocarpus preissii* (recorded in 75% of sample sites)
- *Melaleuca lanceolata* (recorded in 50% of sample sites
- *Poa poiformis* (recorded in 58% of sample sites
- **Trachyandra divaricarta* (recorded in 67% of sample sites).

The full list of vascular flora species recorded within each vegetation unit and at each sample site is presented in **Appendix C** and individual quadrat and relevé data is presented in **Appendix D**.

No species listed as Threatened or Priority flora under the BC Act or under the EPBC Act were recorded. All five of the potentially occurring Threatened and Priority flora resulting from the desktop assessment are annual or short-lived perennial species, emerging and flowering in spring, and would have been unlikely to be present/visible, flowering or presenting identifiable material at the time of the May field survey.

Since *Lepidium puberulum* (P4) has previously been recorded within the study area, and since this species would only be observable during late winter and spring, where clearing impacts may be proposed within areas of suitable habitat (sandy soils associated with limestone), further targeted surveys would be appropriate.

None of the recorded flora are exhibiting an extension beyond their currently documented range, in accordance with records of the Western Australian Herbarium (WAH 1998-).

No taxa listed as Declared Pest [s22(2)] plants under the BAM Act (DPIRD 2022) were recorded. In addition, none of the weed species recorded are listed as WoNS (Commonwealth of Australia 2017).

5.2.2 Vegetation

5.2.2.1 *Vegetation Condition*

The condition of the vegetation within the study area was found to range from 'Excellent' to 'Completely Degraded - Degraded' (**Table 9**). The greatest proportion of the vegetation (31.63%) was observed to be in 'Good' condition. The spatial extent of the varying vegetation condition is presented in **Figure 9**.

Table 9 - Summary Vegetation Condition within the Study Area

Vegetation Condition Rating	Area (ha)	% of Study Area
Excellent	1.020	1.69
Very Good - Excellent	0.064	0.11
Very Good	12.417	20.59
Good - Very Good	13.344	22.13
Good	19.074	31.63
Degraded - Good	4.984	8.26
Degraded	4.134	6.85
Completely Degraded - Degraded	2.223	3.69
Completely Degraded	0.00	0.00
Cleared	3.047	5.05
Total	**60.307**	**100**

5.2.2.2 *Vegetation Units*

Nine vegetation units and three other classifications (Beach, Planted and Cleared areas) were defined and mapped within the study area as described in **Table 10**. More than half of the study area (56.63%) consists of vegetation unit MlAp (*Melaleuca/Acanthocarpus* Woodland), and vegetation unit MlGl (*Melaleuca/Guichenotia* Shrubland) accounts for 16.12% of the study area.

The remaining seven vegetation units account a total of 21.64 % of the study area. The remaining three classifications (Beach, Planted and Cleared areas) occupy 5.61% of the study area. The spatial extent of the varying vegetation units is presented in **Figure 10**.

Table 10 - Summary of Recorded Vegetation Units in the Study Area

Broad Type	Vegetation Unit	Vegetation Description	Site Number	Area (ha)	% of Study Area
Woodland	**MlAp** *Melaleuca/Acanthocarpus* Woodland	*Melaluca lanceolata* Tall Shrubland over *Acanthocarpos preissii* Low Open Shrubland	Q03, Q06, Q08, Q11	34.153	56.63
Shrubland	**ArAp** *Acacia/Acanthocarpus* Shrubland	*Acacia rostellifera* Tall Open Shrubland over *Acathocarpus preissii* Low Shrubland over *Trachyandara divaricata* Low Sparse Forbland	R01	4.050	6.72
	CpMl *Callitris/Melaleuca* Shrubland	*Callitris priessi* and *Melaleuca lanceolata* Tall Shrubland	Q12	0.605	1.00
	MlGl *Melaleuca/Guichenotia* Shrubland	*Melaeluca lanceolata* and *Callitris preissii* Tall Sparse Shrubland over *Guichenotia ledifolia, Acanthocarpus preissii* and *Rhagodia baccata* Shrubland over *Trachyandara divaricata* Low Sparse Forbland	R02	9.722	16.12
	OaAp *Olearia/Acanthocarpus* Shrubland	*Olearia axillaris* Tall Sparse Shrubland over *Acanthocarpos preissii* Low Open Shrubland	R05	2.312	3.83
	TiSS *Tecticornia* Samphire Shrubland	*Tecticornia indica* subsp. *bidens* Low Samphire Shrubland	R09	2.745	4.55
Sedgelands	**GtS** *Gahnia* Sedgeland	*Gahnia trifida* Tall Sedgeland	R04	0.439	0.73
	LpAp *Lepidosperma/Acanthocarpus* Sedgeland	*Acanthocarpos preissii, Rhagodia baccata* and *Conostylis candicans* Low Open Shrubland over *Lepidosperma gladiatum* Open Sedgeland over *Trachyandara divaricata* Low Sparse Forbland	R07	2.091	3.47
Grassland	**SlG** Spinifex Grassland	*Scaevola crassifolia* Low Open Shrubland over *Spinfex longifolius* Grassland	R10	0.811	1.34
Planted		Planted non-endemic species	NA	0.334	0.55
Beach			NA	0.540	0.90
Cleared			NA	2.507	4.16
			TOTAL	**60.309**	**100**

Figure 9 - Vegetation Condition

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RIA22001 12 July 2022

Figure 10 - Vegetation Units

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5.2.2.3 *Assessment of Floristic Community Types*

All vegetation units within the study area were sampled and defined from a single relevé, unless they were suspected to be representative of the TEC, FCT 30a. Four quadrats were sampled in vegetation considered to be representative of FCT 30a and in order to analyse the similarity between these quadrats, floristic analysis was carried out in PATN (Belbin 2013). This floristic analysis grouped three of the quadrats, with the fourth (Q12) determined to be floristically dissimilar, as shown in **Figure 11**.

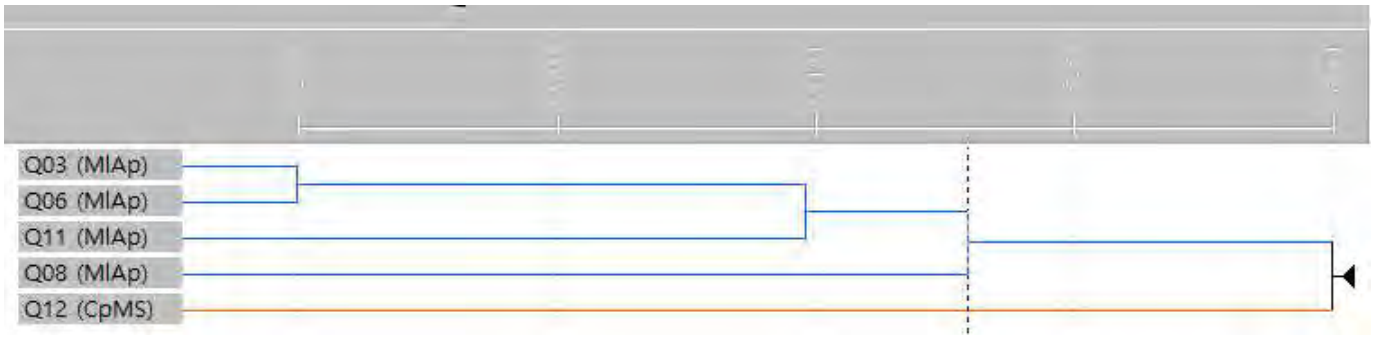

Figure 11 – Quadrat PATN Analysis Dendrogram

In order to then infer the FCT/s most likely represented by the sampled quadrats, floristic analysis was carried out, incorporating reference data from the Gibson *et al.* 1994 and Keighery *et al.* 2012 studies. The analysis was first conducted on the full suite of quadrats (batch analysis) and then via SSI, utilising multivariate cluster analysis of species presence/absence in PATN. The dendrograms resulting from the analyses are presented in **Appendix E**, with these results and the results of dissimilarity analyses presented in **Table 11**.

The floristic analysis determined that all sampled quadrats, representative of vegetation units CpMl (one quadrat) and MlAp (four quadrats) are likely representations of FCT 30a.

5.2.3 Threatened and Priority Ecological Communities

The TEC, *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands TEC (FCT 30a) has been previously reported to occur within the study area. The community, also known as the 'Rottnest Island Pine (*Callitris preissii*) and Rottnest Island Tea Tree (*Melaleuca lanceolata*) Woodland' is listed as a 'Vulnerable' TEC under State legislation (RIA 2014). This community is described as a woodland and forest dominated by *Callitris preissii, Melaleuca lanceolata, Spyridium globulosum, Acanthocarpus preissii, Rhagodia baccata*, *Austrostipa flavescens* and *Trachymene pilosa* (Gibson *et al*. 1994). Critical habitat for this community is the sandy soils on which the community occurs and the fresh superficial groundwater that helps to sustain key dominant trees (DPaW 2014).

The survey and analyses carried out for quadrats assessed within the study area, identified that vegetation units MlAp (*Melaleuca/Acanthocarpus* Woodland) and CpMl (*Callitris/Melaleuca* Shrubland) have the greatest similarity to FCT 30a (**Table 11**). A large proportion of the study area (all areas mapped as vegetation units MlAp and CpMl) (**Figure 11**) is therefore considered to be representative of the Vulnerable TEC, FCT 30a, *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands TEC.

Table 11 – Summary of Floristic Analysis Results

Vegetation Unit	Quadrat	Vegetation Condition	SSI Dendrogram Result*	Ref. Quadrat	FCT	Dissimilarity Value	Ref. Quadrat	FCT	Dissimilarity Value	Ref. Quadrat	FCT	Dissimilarity Value	Inferred FCT	Reasoning
CpMI *Callitris/ Melaleuca* SL	Q12	Very Good	30a, 30a2, S12	rott01	S11	0.6842	WOODP-1	30a	0.6842	WOODP-1	30a	0.6842	30a	Gibson *et al.* (1994) and Keighery *et al.* (2012) quadrats analysed present the same dissimilarity value in comparison to Q12. FCT S11 did not record a dominant species of Q12, *Callitris preissii* and is dominated by *Melaleuca acerosa,* which was absent from Q12. S12 is a sub-type of FCT 30a (DPaW 2014). Key/dominant species of Q12 and FCT 30a align. Greatest similarity to **FCT 30a**.
MIAp *Melaleuca/ Acanthocarpus* Woodland	Q03	Good - Very Good	S12, 29a, S11, 30a	rott01	S11	0.6471	GARD04	30a	0.7273	GARDEN-4	30a2	0.7273	30a	S11 is 'Northern *Acacia rostellifera – Melaleuca acerosa* shrublands', whilst FCT 30a is '*Callitris preissii* (or *Melaleuca lanceolata*) forest and woodlands'. Q03 does not contain *Acacia rostellifera* or *Melaleuca acerosa* and is therefore not considered representative of FCT S11. Based on the height and cover of canopy species, the vegetation is considered to be a Woodland or forest. FCT 29a is a shrubland, lacking the woodland canopy layer present in Q03. S12 is a sub-type of FCT 30a (DPaW 2014). Key/dominant species of Q03 and FCT 30a align. Greatest similarity to **FCT 30a**.
	Q06	Very Good	S12, S11, 29a, 30a	rott01	S11	0.5789	rott03	S12	0.6800	GARD01	30a1	0.6923	30a	S11 is 'Northern *Acacia rostellifera – Melaleuca acerosa* shrublands' and both species are absent from Q06. Based on the height and cover of canopy species, the vegetation is considered to be a woodland or forest. FCT 29a is a shrubland, lacking the woodland canopy layer present in Q06. S12 is a sub-type of FCT 30a (DPaW 2014). Key/dominant species of Q06 and FCT 30a align. Greatest similarity to **FCT 30a**.
	Q08	Good - Very Good	S19, 18, 7	rott01	S11	0.7778	rott06	S12	0.7778	cool 04	17	0.8182	30a	S11 is 'Northern *Acacia rostellifera – Melaleuca acerosa* shrublands' and Q08 did not record either species. *Melaleuca lanceolata,* dominant in Q08 does not occur within FCT 17. S12 is a sub-type of FCT 30a (DPaW 2014). Key/dominant species of Q08 do not align with S19 or FCTs 7 or 18 but do align with FCT 30a. Greatest similarity to **FCT 30a**.
	Q11	Very Good	S11, S12, 30a	rott01	S11	0.5556	MI11	13	0.7273	GARD04	30a2	0.7391	30a	S11 is 'Northern *Acacia rostellifera – Melaleuca acerosa* shrublands' and both species are absent from Q13. FCT 13 is a wetland with key dominant species that do not align with Q13. S12 is a sub-type of FCT 30a (DPaW 2014). Key/dominant species of Q13 and FCT 30a align. Greatest similarity to **FCT 30a**.

5.3 VEGETATION OF SIGNIFICANCE

5.3.1 Nationally Significant Vegetation

The National significance of the vegetation units was assessed based on presence of:

- populations of Threatened (EPBC listed) species
- TECs listed as nationally (EPBC) significant
- Ramsar Wetlands of International Importance (DAWE 2020a).

5.3.1.1 *Threatened Flora*

No EPBC-listed Threatened flora were recorded within the study area and therefore, none of the recorded vegetation units are of significance due to this factor.

5.3.1.2 *Threatened Ecological Communities*

No EPBC-listed TECs are considered to occur within the study area. Therefore, none of the defined vegetation units are considered to be of National Significance due to this factor.

5.3.1.3 *Ramsar Wetlands*

No Ramsar wetlands occur within the study area and therefore, none of the recorded vegetation units are of significance due to this factor.

5.3.2 State Significant Vegetation

The State significance of the vegetation units was assessed based on presence of:

- State listed Threatened flora
- State listed TECs
- land within (or areas recommended by DBCA for inclusion) the State-managed conservation estate.

5.3.2.1 *Threatened Flora*

No State-listed Threatened flora were recorded within the study area and therefore, none of the recorded vegetation units are of significance due to this factor.

5.3.2.2 *TECs*

Two of the defined unit, MIAp and CpMI, were considered to be representative of or form part of a State-listed TEC. Therefore, these vegetation units are considered to be State significance due to this factor.

5.3.2.3 *Conservation Estate*

Rottnest Island (Wadjemup) is an A Class Reserve. Therefore, all recorded vegetation units which occupy the reserve are considered to be of regional significance due to this factor.

5.3.3 Regionally Significant Vegetation

The regional significance of the vegetation units was assessed based on:

- the presence of populations of Priority flora or ecological communities
- the presence of ESAs or areas relevant to a conservation scheme
- the presence of conservation category wetlands
- the presence of high diversity of flora, fauna, communities, or community structure
- the presence of flora species exhibiting range extensions or undescribed species
- having a restricted regional distribution
- being represented by less than 30% of the pre-European extent.

5.3.3.1 *Priority Flora*

No State-listed Priority flora were recorded within the study area and therefore, none of the recorded vegetation units are of significance due to this factor.

5.3.3.2 *Priority Ecological Communities*

No DBCA listed PECs are considered to occur within the study area. Therefore, none of the defined units are considered significant to be of regional significance due to this factor.

5.3.3.3 *ESAs or Conservation Areas*

Rottnest Island is an A Class Reserve, which is therefore an ESA. Therefore, all recorded vegetation units which occupy the reserve are considered to be of regional significance due to this factor.

5.3.3.4 *Conservation Category Wetlands*

No conservation category wetlands occur within the study area. Therefore, none of the defined vegetation units are considered to be of regional significance due to this factor.

5.3.3.5 *High Diversity*

The mean species richness across all quadrats within vegetation units with an affinity for FCT 30a (MlAp and CpMl) was 5.6 species. This compares to the mean species richness recorded by Gibson *et al.* (1994) for FCT SCP 30a, of 21.1 species. The recorded species richness values are considered low in comparison to the respective Gibson *et al.* (1994) sites for FCT SCP 30a.

Of the total 26 species recorded, 19.23% are weeds. The diversity of native taxa recorded within quadrats is not considered high; however, surveying outside of the optimal spring season is likely to have resulted in fewer species (e.g. annuals) being present. None of the recorded vegetation units are considered to exhibit high diversity and are therefore not considered to be of regional significance due to this factor.

5.3.3.6 *Range Extending/Undescribed Flora*

No undescribed or range extending flora species were recorded within the study area. Therefore, none of the defined units are considered significant to be of regional significance due to this factor.

5.3.3.7 *Restricted Regional Representation and Distribution*

Beard (1990) vegetation association 125 is represented by 9,017.32 ha across the Swan Coastal Plain and 1,948.17 ha across the Perth IBRA sub-region, which is considered to be restricted in its representation. However, no areas of vegetation association 125 intersect the study area, and therefore, the none of the recorded vegetation units, are considered to be of regional significance due to this factor.

5.3.3.8 *Extent Remaining*

The Beard (1990) vegetation associations 125 and 15 represented within the study area fall below the unconstrained (30%) threshold, with association 125 also falling below the constrained (10%) threshold for retention in comparison to their pre-European extent. Therefore, vegetation units MlAp and CpMl, representative of the 'Low forest cypress pine', association 15 and vegetation units LpAp, TiSS and GtS, representative of the 'Bare areas; salt lakes', association 125 are considered to be of regional significance due to this factor.

5.3.4 Locally Significant Vegetation

The local significance of the vegetation units was assessed based on:

- representing small, isolated communities
- their local extent (proportion) and distribution.

5.3.4.1 *Small, Isolated Communities*

Vegetation units GtS, LpAp and SlG occur as small, isolated communities within the study area and are considered locally significant due to this factor.

5.3.4.2 *Locally Limited Extent and Distribution*

The vegetation units CpMl (*Callitris/ Melaleuca* Shrubland) and GtS (*Gahnia* Sedgeland) occupy a small portion (≤1%) of the study area, with extents of 1.0% and 0.73%, respectively. These areas are considered limited in their local extent and distribution and are considered locally significant due to this factor.

5.3.5 Summary of Vegetation Significance

The significance of the vegetation units within the study area, along with the aspects determining their significance, are summarised in **Table 12**. The level of significance for each vegetation unit is broadly summarised in **Table 13**.

Table 12 –Summary of the Significance of the Recorded Vegetation Units

Scale	Significance Aspect	Vegetation Units
National Significance	Populations of Threatened (EPBC listed) species	-
	Presence of EPBC listed TECs	-
	Presence of Ramsar wetlands	-
State Significance	Presence of State-listed Threatened flora	-
	Presence of State-listed TECs	MlAp, CpMl
	Land within the Conservation Estate	MlAp, ArAp, CpMl, MlGl, OaAp, TiSS, GtS, LpAp, SlG
Regional Significance	Presence of Priority flora	-
	Presence of PECs	-
	Presence of ESAs or areas relevant to a conservation scheme	MlAp, ArAp, CpMl, MlGl, OaAp, TiSS, GtS, LpAp, SlG
	Presence of conservation category wetlands	-
	High diversity of flora, fauna, communities, or community structure	-
	Presence of flora species exhibiting a range extension	-
	Presence of undescribed flora	-
	Having a restricted regional representation and distribution	-
	Represented by less than 30% of the pre-European extent	MlAp, CpMl, TiSS, LpAp, SlG
Local Significance	Small, isolated communities	GtS, LpAp, SlG
	Having a limited local extent and/or distribution	CpMl, GtS

Table 13 – Summary of Level of Potential Significance

Vegetation Unit	Overall Significance – Factor of Significance	Area (ha)	% of Survey Area
MlAp *Melaleuca/ Acanthocarpus* Woodland	State significance – presence of State-listed TEC State significance – land within the Conservation Estate Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent	34.153	56.63
ArAp *Acacia/Acanthocarpus* Shrubland	State significance – land within the Conservation Estate Regional significance – within an ESA	4.050	6.72
CpMl *Callitris/Melaleuca* Shrubland	State significance – presence of State-listed TEC State significance – land within the Conservation Estate Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent Local significance – limited local extent and/or distribution	0.605	1.00
MlGl *Melaleuca/ Guichenotia* Shrubland	State significance – land within the Conservation Estate Regional significance – within an ESA	9.722	16.12
OaAp *Olearia/ Acanthocarpus* Shrubland	State significance – land within the Conservation Estate Regional significance – within an ESA	2.312	3.83
TiSS *Tecticornia* Samphire Shrubland	State significance – land within the Conservation Estate Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent	2.745	4.55
GtS *Gahnia* Sedgeland	State significance – land within the Conservation Estate Regional significance – within an ESA Local significance – occurring as a small, isolated community Local significance – limited local extent and/or distribution	0.439	0.73
LpAp *Lepidosperma/ Acanthocarpus* Sedgeland	State significance – land within the Conservation Estate Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent Local significance – occurring as a small, isolated community	2.091	3.47
SlG Spinifex Grassland	State significance – land within the Conservation Estate Regional significance – within an ESA Regional significance – Represented by <30% of pre-European extent Local significance – occurring as a small, isolated community	0.811	1.34
Planted		0.334	0.55
Beach		0.540	0.90
Cleared		2.507	4.16
	TOTAL	**60.309**	**100**

6 CONCLUSIONS

The key findings and conclusions arising from the flora and vegetation assessment within the study area:

- No Threatened flora listed under the BC Act or the EPBC Act were recorded.
- No Priority species as listed by DBCA were recorded.
- No weeds listed as WoNS or DP plants under the BAM Act were recorded.
- The condition of the vegetation was found to range from 'Excellent' to 'Completely Degraded - Degraded' with the greatest proportion in 'Good' condition.
- Nine vegetation units and three other classifications (Beach, Planted and Cleared areas) were defined and mapped within the study area.
- Two of the recorded vegetation units were determined to be characteristic of the State-listed *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands TEC (FCT 30a).
- The remaining extent of the one vegetation association supported by the study area falls below the 10% retention target in the context of the Swan Coastal Plain, and two vegetation associations relevant to the study area represented by less than 30% of pre-European extent across the Swan Coastal Plain and Perth IBRA sub-region.
- Vegetation units MlAp and CpMl are considered to be representative of the State-listed *Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands TEC (FCT 30a), and therefore, these units are considered to be of State significance.
- Rottnest Island is an A Class Reserve and an ESA, therefore all vegetation it supports is considered to be of State and regional significance.
- Vegetation units MlAp, CpMl, TiSS, LpAl and SlG are representative of pre-European vegetation associations and/or complexes that have less than 30% of their original extent remaining and are therefore considered regionally significant.
- Vegetation units GtS, LpAp and SlG occur as small, isolated communities, and are therefore considered locally significant.
- Vegetation units CpMl and GtS are limited in their local extent and/or distribution, and are therefore, considered locally significant.
- Since *Lepidium puberulum* (P4) has previously been recorded within the study area, and since this species would only be observable during late winter and spring, where clearing impacts may be proposed within areas of suitable habitat (sandy soils associated with limestone), further targeted surveys would be appropriate.

7 LIST OF PARTICIPANTS

The personnel who contributed to the project are summarised in **Table 12**.

Table 14 – Project Team

Name	Qualification	Years of Relevant Experience	Role
Kellie Bauer–Simpson Principal Ecologist	BSc. (Biological Science)	23	Project manager, field assessment, flora identification, technical and authorisation review
Lisa Chappell Senior Botanist/Environmental Scientist	BEnvSc. (Hons) (Environmental Science)	19	Field assessment, data management, floristic analysis, GIS mapping, report preparation
Olga Nazarova Botanist/Taxonomist	B.Sc. (Botany and Genetics)	4	Field survey, Flora identifications support, technical support, reporting
Megan Gray Ecologist	B.Sc. (Environmental Biology)	3	Report preparation
Kelly Hopkinson Graduate Ecologist	BSc. (Biological Science and Conservation Biology)	1	Report preparation
Will Bauer–Simpson Technician	Cert IV (Health and Safety)	10	Field safety and logistics planning, GIS mapping, spatial analysis, spatial data management
Megan Rabadan Administration		5	Data entry, editorial support

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APPENDIX A - DBCA NATURE MAP SEARCH REPORT

Life Form	Taxon	WA Cons Code
DICOT	*Acacia aptaneura*	
DICOT	*Acacia cyclops*	
DICOT	*Acacia lasiocarpa* var. *lasiocarpa* cockleshell gully variant (e.a.griffin 2039)	
DICOT	*Acacia littorea*	
DICOT	*Acacia rostellifera*	
DICOT	*Acacia truncata*	
DICOT	*Acrotriche cordata*	
DICOT	*Agonis flexuosa* var. *flexuosa*	
DICOT	*Alyxia buxifolia*	
DICOT	*Angianthus cunninghamii*	
DICOT	*Angianthus preissianus*	
DICOT	*Apium annuum*	
DICOT	*Arctotheca calendula*	
DICOT	*Arctotheca populifolia*	
DICOT	*Arenaria leptoclados*	
DICOT	*Argyranthemum frutescens*	
DICOT	*Atriplex cinerea*	
DICOT	*Atriplex isatidea*	
DICOT	*Atriplex rhagodioides*	
DICOT	*Atriplex sp.*	
DICOT	*Beyeria viscosa*	
DICOT	*Boronia alata*	
DICOT	*Caesalpinia gilliesii*	
DICOT	*Cakile maritima*	
DICOT	*Cakile maritima* Scop. subsp. *maritima*	
DICOT	*Calandrinia brevipedata*	
DICOT	*Calandrinia tholiformis*	
DICOT	*Callitriche stagnalis*	
DICOT	*Canarium mutabile*	
DICOT	*Cardamine hirsuta*	
DICOT	*Carduus pycnocephalus*	
DICOT	*Carpobrotus virescens*	
DICOT	*Cassytha glabella*	
DICOT	*Casuarina equisetifolia*	
DICOT	*Casuarina glauca*	
DICOT	*Casuarina obesa*	
DICOT	*Centaurea melitensis*	
DICOT	*Centaurium erythraea*	
DICOT	*Centaurium pulchellum*	
DICOT	*Centaurium tenuiflorum*	
DICOT	*Cerastium balearicum*	
DICOT	*Cerastium glomeratum*	
DICOT	*Chenopodium murale*	
DICOT	*Cirsium vulgare*	
DICOT	*Clematis linearifolia*	
DICOT	*Clematis microphylla*	
DICOT	*Comesperma confertum*	

Life Form	Taxon	WA Cons Code
DICOT	*Comesperma integerrimum*	
DICOT	*Conyza bonariensis*	
DICOT	*Conyza parva*	
DICOT	*Conyza sumatrensis*	
DICOT	*Cotula australis*	
DICOT	*Cotula bipinnata*	
DICOT	*Cotula coronopifolia*	
DICOT	*Crassula colorata*	
DICOT	*Crassula colorata* var. *colorata*	
DICOT	*Crassula decumbens*	
DICOT	*Crassula decumbens* var. *decumbens*	
DICOT	*Crassula glomerata*	
DICOT	*Crassula natans* var. *minus*	
DICOT	*Crassula thunbergiana* subsp. *thunbergiana*	
DICOT	*Cymbalaria muralis*	
DICOT	*Daucus glochidiatus*	
DICOT	*Dichondra repens*	
DICOT	*Diplolaena dampieri*	
DICOT	*Diplotaxis muralis*	
DICOT	*Dischisma arenarium*	
DICOT	*Dittrichia graveolens*	
DICOT	*Dodonaea aptera*	
DICOT	*Drosera ramellosa*	
DICOT	*Drosera stolonifera* subsp. *stolonifera*	
DICOT	*Enchylaena tomentosa* var. *tomentosa*	
DICOT	*Eremophila glabra*	
DICOT	*Eremophila glabra* subsp. *albicans*	
DICOT	*Erodium cicutarium*	
DICOT	*Erythrostemon gilliesii*	
DICOT	*Eucalyptus camaldulensis*	
DICOT	*Eucalyptus camaldulensis* subsp. *obtusa*	
DICOT	*Eucalyptus decipiens*	
DICOT	*Eucalyptus erythrocorys*	
DICOT	*Eucalyptus gomphocephala*	
DICOT	*Eucalyptus spathulata*	
DICOT	*Eucalyptus utilis*	
DICOT	*Euphorbia paralias*	
DICOT	*Euphorbia peplus*	
DICOT	*Ficus carica*	
DICOT	*Ficus elastica*	
DICOT	*Ficus macrophylla*	
DICOT	*Ficus microcarpa* subsp. *hillii*	
DICOT	*Ficus rubiginosa*	
DICOT	*Frankenia pauciflora*	
DICOT	*Galium murale*	
DICOT	*Gamochaeta calviceps*	
DICOT	*Geranium molle*	
DICOT	*Gnaphalium indutum*	
DICOT	*Gnaphalium indutum* subsp. *indutum*	

Life Form	Taxon	WA Cons Code
DICOT	*Gomphocarpus fruticosus*	
DICOT	*Gonocarpus pithyoides*	
DICOT	*Guichenotia ledifolia*	
DICOT	*Halosarcia halocnemoides* subsp. *halocnemoides*	
DICOT	*Halosarcia indica* subsp. *bidens*	
DICOT	*Hardenbergia comptoniana*	
DICOT	*Hedypnois rhagadioloides*	
DICOT	*Hedypnois rhagadioloides* subsp. *cretica*	
DICOT	*Heliophila pusilla*	
DICOT	*Heliotropium curassavicum*	
DICOT	*Hemichroa pentandra*	
DICOT	*Hibbertia racemosa*	
DICOT	*Hornungia procumbens*	
DICOT	*Hydrocotyle blepharocarpa*	
DICOT	*Hydrocotyle diantha*	
DICOT	*Hydrocotyle hispidula*	
DICOT	*Hydrocotyle* sp. Hamelinensis (G.J. Keighery s.n. PERTH 02391325)	
DICOT	*Hydrocotyle tetragonocarpa*	
DICOT	*Hypochaeris glabra*	
DICOT	*Lagunaria patersonia*	
DICOT	*Leontodon rhagadioloides*	
DICOT	*Lepidium didymum*	
DICOT	*Lepidium foliosum*	
DICOT	*Lepidium puberulum*	P4
DICOT	*Leptorhynchos scaber*	
DICOT	*Leucophyta brownii*	
DICOT	*Leucopogon insularis*	
DICOT	*Leucopogon parviflorus*	
DICOT	*Lobelia anceps*	
DICOT	*Lycium ferocissimum*	
DICOT	*Lycopersicon esculentum*	
DICOT	*Lysiana casuarinae*	
DICOT	*Lysimachia arvensis*	
DICOT	*Malva arborea*	
DICOT	*Malva parviflora*	
DICOT	*Malva preissiana*	
DICOT	*Medicago polymorpha*	
DICOT	*Medicago sativa*	
DICOT	*Melaleuca armillaris*	
DICOT	*Melaleuca huegelii*	
DICOT	*Melaleuca lanceolata*	
DICOT	*Melaleuca nesophila*	
DICOT	*Melia azedarach*	
DICOT	*Melianthus major*	
DICOT	*Melilotus indicus*	
DICOT	*Mesembryanthemum crystallinum*	
DICOT	*Millotia myosotidifolia*	
DICOT	*Minuartia mediterranea*	
DICOT	*Myoporum caprarioides*	

Life Form	Taxon	WA Cons Code
DICOT	*Myoporum insulare*	
DICOT	*Myosotis australis*	P4
DICOT	*Nerium oleander*	
DICOT	*Nicotiana glauca*	
DICOT	*Nitraria billardierei*	
DICOT	*Olea europaea*	
DICOT	*Olearia axillaris*	
DICOT	*Orobanche minor*	
DICOT	*Oxalis corniculata*	
DICOT	*Oxalis exilis*	
DICOT	*Oxalis pes-caprae*	
DICOT	*Parentucellia latifolia*	
DICOT	*Parietaria cardiostegia*	
DICOT	*Parietaria debilis*	
DICOT	*Pelargonium capitatum*	
DICOT	*Pelargonium littorale*	
DICOT	*Phyllangium divergens*	
DICOT	*Phyllanthus calycinus*	
DICOT	*Pithocarpa cordata*	
DICOT	*Pittosporum ligustrifolium*	
DICOT	*Plantago debilis*	
DICOT	*Plantago exilis*	
DICOT	*Plantago lanceolata*	
DICOT	*Podotheca angustifolia*	
DICOT	*Polycarpon tetraphyllum*	
DICOT	*Poranthera drummondii*	
DICOT	*Portulaca oleracea*	
DICOT	*Ranunculus pumilio*	
DICOT	*Ranunculus pumilio* var. *politus*	
DICOT	*Raphanus raphanistrum*	
DICOT	*Reseda alba*	
DICOT	*Reseda luteola*	
DICOT	*Rhagodia baccata*	
DICOT	*Rhagodia baccata* subsp. *baccata*	
DICOT	*Rhagodia baccata* subsp. *dioica*	
DICOT	*Rhamnus alaternus*	
DICOT	*Rhodanthe citrina*	
DICOT	*Ricinus communis*	
DICOT	*Roepera billardierei*	
DICOT	*Roepera similis*	
DICOT	*Sagina apetala*	
DICOT	*Sagina maritima*	
DICOT	*Salicornia blackiana*	
DICOT	*Salicornia quinqueflora*	
DICOT	*Salicornia* sp.	
DICOT	*Salsola australis*	
DICOT	*Samolus repens*	
DICOT	*Samolus repens* (J.R.Forst. & G.Forst.) Pers. var. *repens*	
DICOT	*Sarcocornia quinqueflora*	

Life Form	Taxon	WA Cons Code
DICOT	*Sarcocornia quinqueflora* (Bunge ex Ung.-Sternb.) A.J.Scott subsp. *quinqueflora*	
DICOT	*Scaevola crassifolia*	
DICOT	*Schenkia australis*	
DICOT	*Schinus terebinthifolius*	
DICOT	*Scholtzia involucrata*	
DICOT	*Senecio lautus* subsp. *maritimus*	
DICOT	*Senecio pinnatifolius* var. *latilobus*	
DICOT	*Senecio pinnatifolius* var. *maritimus*	
DICOT	*Silene nocturna*	
DICOT	*Sisymbrium orientale*	
DICOT	*Solanum lycopersicum*	
DICOT	*Solanum nigrum*	
DICOT	*Solanum symonii*	
DICOT	*Sonchus asper*	
DICOT	*Sonchus oleraceus*	
DICOT	*Spergularia brevifolia*	
DICOT	*Spyridium globulosum*	
DICOT	*Stackhousia pubescens*	
DICOT	*Stellaria media*	
DICOT	*Stellaria pallida*	
DICOT	*Stylidium androsaceum*	
DICOT	*Suaeda australis*	
DICOT	*Tamarix aphylla*	
DICOT	*Tamarix* sp.	
DICOT	*Tecoma stans*	
DICOT	*Tecticornia halocnemoides*	
DICOT	*Tecticornia indica* subsp. *bidens*	
DICOT	*Templetonia retusa*	
DICOT	*Tetragonia amplexicoma*	
DICOT	*Tetragonia decumbens*	
DICOT	*Tetragonia implexicoma*	
DICOT	*Thomasia cognata*	
DICOT	*Threlkeldia diffusa*	
DICOT	*Trachymene coerulea*	
DICOT	*Trachymene coerulea* subsp. *coerulea*	
DICOT	*Trachymene pilosa*	
DICOT	*Trifolium suffocatum*	
DICOT	*Trifolium tomentosum*	
DICOT	*Trifolium tomentosum* var. *tomentosum*	
DICOT	*Urtica urens*	
DICOT	*Verbascum* sp. *scsp*	
DICOT	*Waitzia nitida*	
DICOT	*Westringia dampieri*	
DICOT	*Wilsonia backhousei*	
DICOT	*Wilsonia humilis*	
DICOT	*Zygophyllum ammophilum*	
DICOT	*Zygophyllum fruticulosum*	
GYMNO	*Callitris preissii*	
GYMNO	*Pinus halepensis*	

Life Form	Taxon	WA Cons Code
GYMNO	*Pinus radiata*	
LIVERWORT	*Petalophyllum preissii*	
MONOCOT	*Acanthocarpus preissii*	
MONOCOT	*Agave americana*	
MONOCOT	*Agave attenuata*	
MONOCOT	*Agave sisalana*	
MONOCOT	*Aira cupaniana*	
MONOCOT	*Allium ampeloprasum*	
MONOCOT	*Althenia preissii*	
MONOCOT	*Amaryllis dianae*	
MONOCOT	*Amaryllis quokka*	
MONOCOT	*Amphibolis antarctica*	
MONOCOT	*Amphibolis griffithii*	
MONOCOT	*Asphodelus fistulosus*	
MONOCOT	*Austrostipa elegantissima*	
MONOCOT	*Austrostipa flavescens*	
MONOCOT	*Austrostipa* sp.	
MONOCOT	*Avellinia michelii*	
MONOCOT	*Avena barbata*	
MONOCOT	*Baumea juncea*	
MONOCOT	*Brachypodium distachyon*	
MONOCOT	*Briza minor*	
MONOCOT	*Bromus arenarius*	
MONOCOT	*Bromus diandrus*	
MONOCOT	*Bromus hordeaceus*	
MONOCOT	*Bromus madritensis*	
MONOCOT	*Bromus rubens*	
MONOCOT	*Bulbine semibarbata*	
MONOCOT	*Caladenia latifolia*	
MONOCOT	*Carex preissii*	
MONOCOT	*Carex thecata*	
MONOCOT	*Catapodium rigidum*	
MONOCOT	*Cenchrus clandestinus*	
MONOCOT	*Centrolepis polygyna*	
MONOCOT	*Conostylis candicans*	
MONOCOT	*Conostylis candicans* subsp. *calcicola*	
MONOCOT	*Conostylis candicans* subsp. *candicans*	
MONOCOT	*Cortaderia selloana*	
MONOCOT	*Cynodon dactylon*	
MONOCOT	*Cyrtostylis huegelii*	
MONOCOT	*Desmocladus flexuosus*	
MONOCOT	*Ehrharta brevifolia*	
MONOCOT	*Ehrharta brevifolia* var. *cuspidata*	
MONOCOT	*Ehrharta longiflora*	
MONOCOT	*Eragrostis curvula*	
MONOCOT	*Ferraria crispa*	
MONOCOT	*Ferraria crispa* subsp. *crispa*	
MONOCOT	*Ficinia nodosa*	
MONOCOT	*Gahnia trifida*	

Life Form	Taxon	WA Cons Code
MONOCOT	*Halophila australis*	
MONOCOT	*Halophila ovalis*	
MONOCOT	*Heterozostera tasmanica*	
MONOCOT	*Hordeum leporinum*	
MONOCOT	*Hordeum* sp.	
MONOCOT	*Hydrilla verticillata*	
MONOCOT	*Hypoxis glabella* var. *glabella*	
MONOCOT	*Iris germanica*	
MONOCOT	*Isolepis cernua*	
MONOCOT	*Isolepis cernua* var. *setiformis*	
MONOCOT	*Isolepis marginata*	
MONOCOT	*Johnsonia pubescens*	
MONOCOT	*Johnsonia pubescens* subsp. *pubescens*	
MONOCOT	*Juncus bufonius*	
MONOCOT	*Juncus kraussii* subsp. *australiensis*	
MONOCOT	*Lachnagrostis nesomytica*	
MONOCOT	*Lachnagrostis nesomytica* subsp. *nesomytica*	P1
MONOCOT	*Lachnagrostis nesomytica* subsp. *pseudofiliformis*	P1
MONOCOT	*Lachnagrostis* sp.	
MONOCOT	*Lagurus ovatus*	
MONOCOT	*Lepidosperma calcicola*	
MONOCOT	*Lepidosperma gladiatum*	
MONOCOT	*Lepidosperma pubisquameum*	
MONOCOT	*Lepidosperma squamatum*	
MONOCOT	*Leucojum aestivum*	
MONOCOT	*Lolium rigidum*	
MONOCOT	*Microlaena stipoides*	
MONOCOT	*Moraea flaccida*	
MONOCOT	*Moraea miniata*	
MONOCOT	*Narcissus papyraceus*	
MONOCOT	*Narcissus tazetta*	
MONOCOT	*Narcissus tazetta* subsp. *italicus*	
MONOCOT	*Ornithogalum arabicum*	
MONOCOT	*Parapholis incurva*	
MONOCOT	*Pauridia glabella*	
MONOCOT	*Phoenix canariensis*	
MONOCOT	*Phoenix dactylifera*	
MONOCOT	*Phormium tenax*	
MONOCOT	*Poa annua*	
MONOCOT	*Poa poiformis*	
MONOCOT	*Polypogon maritimus*	
MONOCOT	*Polypogon maritimus* var. *subspatheaceus*	
MONOCOT	*Polypogon monspeliensis*	
MONOCOT	*Polypogon tenellus*	
MONOCOT	*Posidonia australis*	
MONOCOT	*Posidonia coriacea*	
MONOCOT	*Posidonia sinuosa*	
MONOCOT	*Prasophyllum giganteum*	
MONOCOT	*Romulea rosea* var. *australis*	

Life Form	Taxon	WA Cons Code
MONOCOT	*Rostraria cristata*	
MONOCOT	*Ruppia polycarpa*	
MONOCOT	*Ruppia tuberosa*	
MONOCOT	*Rytidosperma occidentale*	
MONOCOT	*Schoenus humilis*	
MONOCOT	*Schoenus nitens*	
MONOCOT	*Sorghum bicolor*	
MONOCOT	*Spinifex hirsutus*	
MONOCOT	*Spinifex longifolius*	
MONOCOT	*Sporobolus indicus* var. *capensis*	
MONOCOT	*Sporobolus virginicus*	
MONOCOT	*Stenotaphrum secundatum*	
MONOCOT	*Syringodium isoetifolium*	
MONOCOT	*Thalassodendron pachyrhizum*	
MONOCOT	*Thysanotus patersonii*	
MONOCOT	*Trachyandra divaricata*	
MONOCOT	*Triglochin minutissima*	
MONOCOT	*Triglochin mucronata*	
MONOCOT	*Triglochin muelleri* subsp. *recurvum*	
MONOCOT	*Triglochin striata*	
MONOCOT	*Triglochin trichophora*	
MONOCOT	*Typha orientalis*	
MONOCOT	*Vulpia fasciculata*	
MONOCOT	*Vulpia muralis*	
MONOCOT	*Vulpia myuros*	
MONOCOT	*Vulpia myuros* forma *megalura*	
MONOCOT	*Washingtonia filifera*	
MONOCOT	*Washingtonia robusta*	
MONOCOT	*Wurmbea dioica* subsp. *alba*	
MONOCOT	*Wurmbea monantha*	
MONOCOT	*Zantedeschia aethiopica*	
MOSS	*Bryum pachytheca*	
MOSS	*Pseudocrossidium hornschuchianum*	
MOSS	*Racopilum cuspidigerum* var. *convolutaceum*	
MOSS	*Syntrichia pagorum*	
MOSS	*Thuidiopsis sparsa*	
MOSS	*Weissia controversa*	

APPENDIX B - EPBC PROTECTED MATTERS SEARCH REPORT

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 08-Jun-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	39
Listed Migratory Species:	65

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	93
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	13
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text
BIRD		
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area
Sternula nereis nereis Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area

Scientific Name	Threatened Category	Presence Text
Thalassarche carteri		
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta		
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida		
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris		
Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi		
White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Zanda latirostris listed as Calyptorhynchus latirostris		
Carnaby's Black Cockatoo, Short-billed Black-cockatoo [87737]	Endangered	Species or species habitat may occur within area
FISH		
Thunnus maccoyii		
Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area
INSECT		
Hesperocolletes douglasi		
Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area
MAMMAL		
Balaenoptera musculus		
Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Eubalaena australis		
Southern Right Whale [40]	Endangered	Breeding known to occur within area

Scientific Name	Threatened Category	Presence Text
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area
PLANT		
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area
REPTILE		
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
SHARK		
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Rhincodon typus Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Sphyrna lewini Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area

Listed Migratory Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Migratory Marine Birds		
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Ardenna carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Hydroprogne caspia Caspian Tern [808]		Breeding known to occur within area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Migratory Marine Species		
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area
Mobula birostris as Manta birostris Giant Manta Ray [90034]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
[Natator depressus](#)		
Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
[Orcinus orca](#)		
Killer Whale, Orca [46]		Species or species habitat may occur within area
[Pristis pristis](#)		
Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area
[Rhincodon typus](#)		
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area
Migratory Terrestrial Species		
[Motacilla cinerea](#)		
Grey Wagtail [642]		Species or species habitat may occur within area
Migratory Wetlands Species		
[Actitis hypoleucos](#)		
Common Sandpiper [59309]		Species or species habitat known to occur within area
[Arenaria interpres](#)		
Ruddy Turnstone [872]		Roosting known to occur within area
[Calidris acuminata](#)		
Sharp-tailed Sandpiper [874]		Roosting known to occur within area
[Calidris alba](#)		
Sanderling [875]		Roosting known to occur within area
[Calidris canutus](#)		
Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area
[Calidris ferruginea](#)		
Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area

Scientific Name	Threatened Category	Presence Text
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area
Thalasseus bergii Greater Crested Tern [83000]		Breeding known to occur within area
Tringa brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area
Tringa stagnatilis Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area
Tringa totanus Common Redshank, Redshank [835]		Roosting known to occur within area
Xenus cinereus Terek Sandpiper [59300]		Roosting known to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species		[Resource Information]
Scientific Name	Threatened Category	Presence Text
Bird		
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area
Calidris alba Sanderling [875]		Roosting known to occur within area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Species or species habitat may occur within area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Species or species habitat may occur within area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area

Scientific Name	Threatened Category	Presence Text
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area
Pandion haliaetus Osprey [952]		Breeding known to occur within area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area
Rostratula australis as Rostratula benghalensis (sensu lato) Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area
Sternula nereis as Sterna nereis Fairy Tern [82949]		Breeding known to occur within area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Species or species habitat may occur within area
Thalasseus bergii as Sterna bergii Greater Crested Tern [83000]		Breeding known to occur within area
Thinornis cucullatus as Thinornis rubricollis Hooded Plover, Hooded Dotterel [87735]		Species or species habitat known to occur within area overfly marine area
Tringa brevipes as Heteroscelus brevipes Grey-tailed Tattler [851]		Roosting known to occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area

Scientific Name	Threatened Category	Presence Text
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area
[Tringa totanus](#) Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area
[Xenus cinereus](#) Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area
Fish		
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area
[Hippocampus angustus](#) Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area
[Hippocampus subelongatus](#) West Australian Seahorse [66722]		Species or species habitat may occur within area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area
[Lissocampus caudalis](#) Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area
Stigmatopora nigra Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area

Scientific Name	Threatened Category	Presence Text
Urocampus carinirostris Hairy Pipefish [66282]		Species or species habitat may occur within area
Vanacampus margaritifer Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area
Vanacampus phillipi Port Phillip Pipefish [66284]		Species or species habitat may occur within area
Vanacampus poecilolaemus Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area
Mammal		
Arctocephalus forsteri Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area
Neophoca cinerea Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area
Reptile		
Aipysurus pooleorum Shark Bay Seasnake [66061]		Species or species habitat may occur within area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area

Scientific Name	Threatened Category	Presence Text
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area

Whales and Other Cetaceans		[Resource Information]
Current Scientific Name	Status	Type of Presence
Mammal		
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area

Current Scientific Name	Status	Type of Presence
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area

Extra Information

State and Territory Reserves		[Resource Information]
Protected Area Name	Reserve Type	State
Rottnest Island	State Reserve	WA

Nationally Important Wetlands	[Resource Information]
Wetland Name	State
Rottnest Island Lakes	WA

EPBC Act Referrals			[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status
Not controlled action			
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed
Rottnest Lodge Redevelopment	2019/8565	Not Controlled Action	Completed
Seismic Survey, Bremer Basin, Mentelle Basin and Zeewyck Sub-basin	2004/1700	Not Controlled Action	Completed

Biologically Important Areas		
Scientific Name	Behaviour	Presence

Scientific Name	Behaviour	Presence
Seabirds		
Ardenna carneipes Flesh-footed Shearwater [82404]	Aggregation	Known to occur
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur
Eudyptula minor Little Penguin [1085]	Foraging (provisioning young)	Known to occur
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Former Range
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur
Sterna dougallii Roseate Tern [817]	Foraging	Known to occur
Sternula nereis Fairy Tern [82949]	Foraging (in high numbers)	Known to occur
Seals		
Neophoca cinerea Australian Sea Lion [22]	Foraging (male)	Likely to occur
Whales		
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur
Eubalaena australis Southern Right Whale [40]	Calving buffer	Known to occur

Scientific Name	Behaviour	Presence
Megaptera novaeangliae		
Humpback Whale [38]	Migration (north and south)	Known to occur

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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APPENDIX C – FLORA SPECIES BY VEGETATION UNIT

*denotes introduced (weed) species

Family	Taxon	MIAp				CpMI	ArAp	MIGl	GtS	OaAp	LpAp	TiSS	SIG
		Q03	Q06	Q08	Q11	Q12	R01	R02	R04	R05	R07	R09	R10
Asparagaceae	*Acanthocarpus preissii*	+	+	+	+		+	+		+	+		+
Araliaceae	*Trachymene coerulea*						+						
Asphodelaceae	**Asphodelus fistulosus*									+		+	+
Asphodelaceae	**Trachyandra divaricata*	+	+		+	+	+	+			+		+
Asteraceae	**Dittrichia graveolens*							+		+		+	+
Asteraceae	*Olearia axillaris*									+	+		
Casuarinaceae	*Allocasuarina huegeliana*				+								
Chenopodiaceae	*Rhagodia baccata*							+			+		
Chenopodiaceae	*Tecticornia indica* subsp. *bidens*											+	
Cupressaceae	*Callitris preissii*		+			+		+					
Cyperaceae	*Gahnia trifida*			+					+			+	
Cyperaceae	*Lepidosperma gladiatum*										+		
Cyperaceae	*Lepidosperma pubisquameum*									+			
Fabaceae	*Acacia rostellifera*				+	+	+	+			+		
Goodeniaceae	*Scaevola crassifolia*						+						+
Haemodoraceae	*Conostylis candicans*										+		
Malvaceae	*Guichenotia ledifolia*		+				+	+					
Myrtaceae	*Agonis flexuosa*					+							
Myrtaceae	*Eucalyptus platypus*					+							
Myrtaceae	*Melaleuca lanceolata*	+	+	+	+	+		+					
Poaceae	*Austrostipa flavescens*							+					
Poaceae	**Pentameris airoides*			+									
Poaceae	*Poa poiformis*	+	+	+				+		+	+	+	
Poaceae	*Spinifex longifolius*												+
Poaceae	*Sporobolus virginicus*											+	
Zygophyllaceae	*Roepera* sp.			+									

APPENDIX D – QUADRAT AND RELEVÉ SITE DATA

Site Q03

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362326mE 6457483mN
Vegetation Unit	Melaleuca/ Acanthocarpus Woodland
Slope	Flat
Landform	Valley
Soil Colour	Brown
Soil Type	Sand
Litter	70%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Good to Very Good
Disturbances/Impacts	Loss of structure, no mid or understorey

Species	Height (m)	% Cover
Melaleuca lanceolata	10	70
Poa poiformis	0.2	1
Acanthocarpus preissii	0.15	<1
Trachyandra divaricata	0.1	<1
Cotyledon sp.	0.01	1

Site Q06

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362619mE 6457770mN
Vegetation Unit	Melaleuca/ Acanthocarpus Woodland
Slope	Steep
Landform	Hilltop
Soil Colour	Pale brown
Soil Type	Sand
Litter	25%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Very Good
Disturbances/Impacts	Some weeds, some loss of mid-storey

Species	Height (m)	% Cover
Melaleuca lanceolata	9	20
Acanthocarpus preissii	1	15
Poa poiformis	0.7	4
Guichenotia ledifolia	0.6	7
Trachyandra divaricata		+
Callitris preissii		Associated

Site Q08

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362948mE 6457893mN
Vegetation Unit	Melaleuca/ Acanthocarpus Woodland
Slope	Flat
Landform	Swamp edge
Soil Colour	Brown
Soil Type	Sandy clay
Litter	90%
Bare Ground	2%
Fire Age	>10 Years
Vegetation Condition	Good to Very Good
Disturbances/Impacts	Fallen wood, dry conditions

Species	Height (m)	% Cover
Melaleuca lanceolata	11	70
Gahnia trifida	0.6	1
Poa poiformis	0.3	1
Acanthocarpus preissii		+
Pentameris airoides		+
Zygophyllum sp.		+

Site Q11

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362690mE 6458323mN
Vegetation Unit	Melaleuca/ Acanthocarpus Woodland
Slope	Moderate
Landform	Hillside
Soil Colour	Pale brown
Soil Type	Sand
Litter	20%
Bare Ground	5%
Fire Age	>10 Years
Vegetation Condition	Very Good
Disturbances/Impacts	Fallen wood, weeds

Species	Height (m)	% Cover
Melaleuca lanceolata	8	25
Allocasuarina huegeliana	5	1
Acanthocarpus preissii	0.8	30
Acacia rostellifera		+
Trachyandra divaricata		+

Site Q12

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362392mE 6458498mN
Vegetation Unit	Callitris/ Melaleuca Shrubland
Slope	Flat
Landform	Flat
Soil Colour	Pale brown
Soil Type	Sand
Litter	50%
Bare Ground	5%
Fire Age	5-10 Years
Vegetation Condition	Very Good
Disturbances/Impacts	No structure (rehab?)

Species	Height (m)	% Cover
Callitris preissii	4	15
Agonis flexuosa	3	5
Melaleuca lanceolata	3	5
Acacia rostellifera	3	12
Eucalyptus platypus		Associated
Trachyandra divaricata		Associated

Site R01

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362253mE 6457299mN
Vegetation Unit	Acacia/ Acanthocarpus Shrubland
Slope	Moderate
Landform	Valley
Soil Colour	Brown
Soil Type	Sand
Litter	80%
Bare Ground	0%
Fire Age	5-10 Years
Vegetation Condition	Excellent
Disturbances/Impacts	Negligible

Species	Height (m)	% Cover
Acacia rostellifera	5	20
Acanthocarpus preissii	1	40
Trachyandra divaricata	0.2	1
Guichenotia ledifolia		+
Scaevola crassifolia		+
Trachymene coerulea		+

Site R02

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362262mE 6457381mN
Vegetation Unit	Melaleuca/ Guichenotia Shrubland
Slope	Moderate
Landform	Hillside
Soil Colour	Pale brown
Soil Type	Sand
Litter	15%
Bare Ground	15%
Fire Age	5-10 Years
Vegetation Condition	Good
Disturbances/Impacts	Weeds, loss of structure

Species	Height (m)	% Cover
Melaleuca lanceolata	2.5	2
Callitris preissii	2	2
Guichenotia ledifolia	1	30
Acanthocarpus preissii	0.8	15
Rhagodia baccata	0.6	5
Trachyandra divaricata	0.3	1
Acacia rostellifera		+
Austrostipa flavescens		+
Dittrichia graveolens		+
Poa poiformis		+

Site R04

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362490mE 6457633mN
Vegetation Unit	Gahnia Sedgeland
Slope	Flat
Landform	Swamp
Soil Colour	Brown
Soil Type	Clay
Litter	5%
Bare Ground	20%
Fire Age	>10 Years
Vegetation Condition	Very Good to Excellent
Disturbances/Impacts	No diversity

Species	Height (m)	% Cover
Gahnia trifida	1.3	30

Site R05

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362486mE 6457775mN
Vegetation Unit	Olearia/ Acanthocarpus Shrubland
Slope	Moderate
Landform	Hillside
Soil Colour	Pale brown
Soil Type	Sand
Litter	15%
Bare Ground	25%
Fire Age	5-10 Years
Vegetation Condition	Very Good
Disturbances/Impacts	Weeds

Species	Height (m)	% Cover
Olearia axillaris	2	10
Acanthocarpus preissii	0.6	20
Asphodelus fistulosus	0.5	5
Poa poiformis	0.4	4
Dittrichia graveolens		+
Lepidosperma pubisquameum		+
Lepidosperma gladiatum	0.7	15
Rhagodia baccata	0.5	4

Site R07

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362738mE 6457638mN
Vegetation Unit	Lepidosperma/ Acanthocarpus Sedgeland
Slope	Steep
Landform	Hillside
Soil Colour	Very pale brown
Soil Type	Sand
Litter	10%
Bare Ground	15%
Fire Age	5-10 Years
Vegetation Condition	Good
Disturbances/Impacts	Some weeds

Species	Height (m)	% Cover
Acanthocarpus preissii	0.5	25
Conostylis candicans	0.3	8
Trachyandra divaricata	0.1	3
Acacia rostellifera		+
Olearia axillaris		+
Poa poiformis		+

Site Q09

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	362987mE 6458043mN
Vegetation Unit	Tecticornia Samphire Shrubland
Slope	Flat
Landform	Swamp
Soil Colour	Pale brown
Soil Type	Clay
Litter	10%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Very Good
Disturbances/Impacts	Nil

Species	Height (m)	% Cover
Spinifex longifolius	0.8	50
Scaevola crassifolia	0.3	15
Acanthocarpus preissii		+
Asphodelus fistulosus		+
Dittrichia graveolens		+
Trachyandra divaricata		+

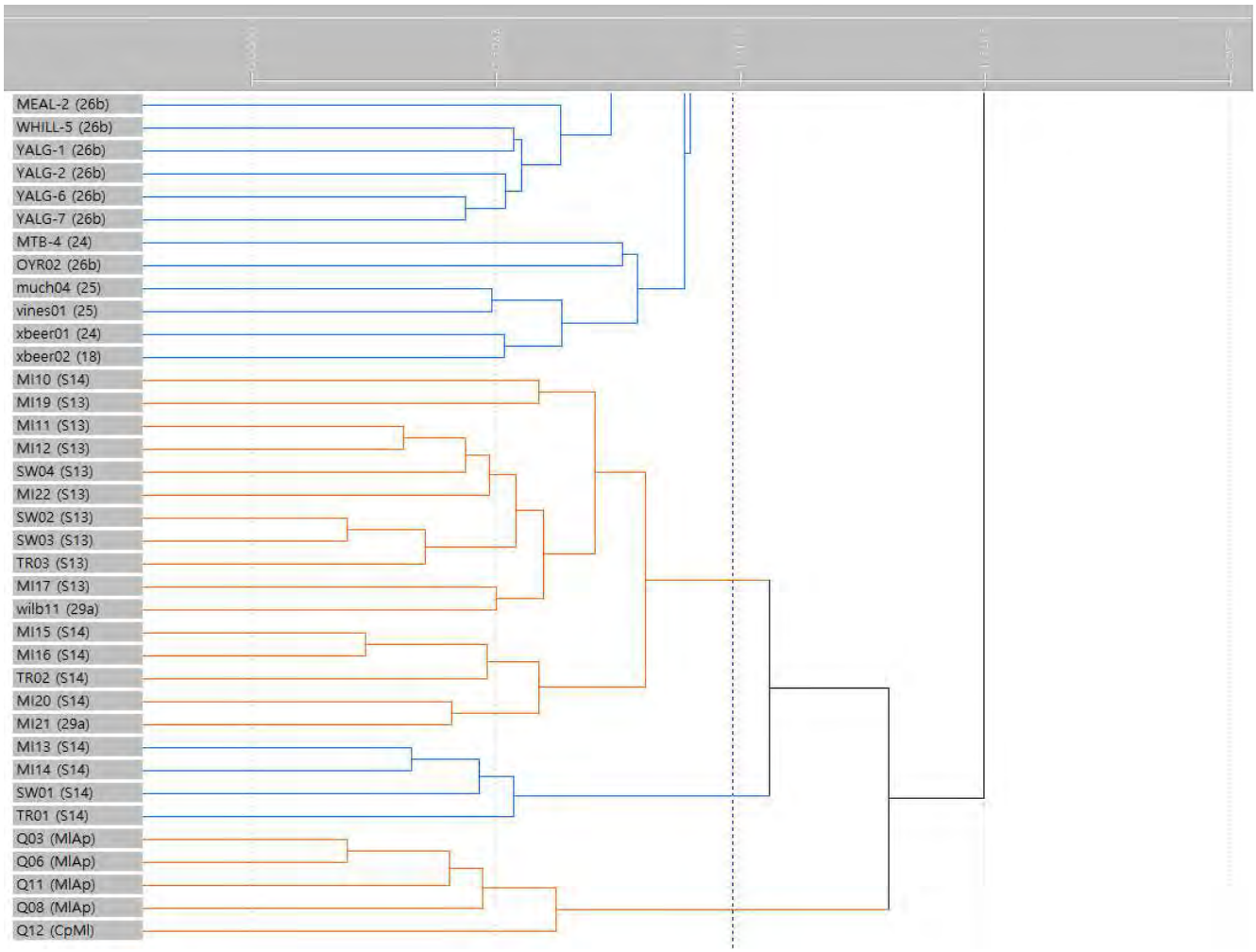
Site R10

Date	2 May 2022
Botanist	Kellie Bauer-Simpson and Lisa Chappell
Quadrat Size	10 x 10 m
NW Corner Coordinates	363577mE 6458299mN
Vegetation Unit	Spinifex Grassland
Slope	Steep
Landform	Foredune
Soil Colour	White
Soil Type	Sand
Litter	5%
Bare Ground	15%
Fire Age	>10 Years
Vegetation Condition	Degraded to Good

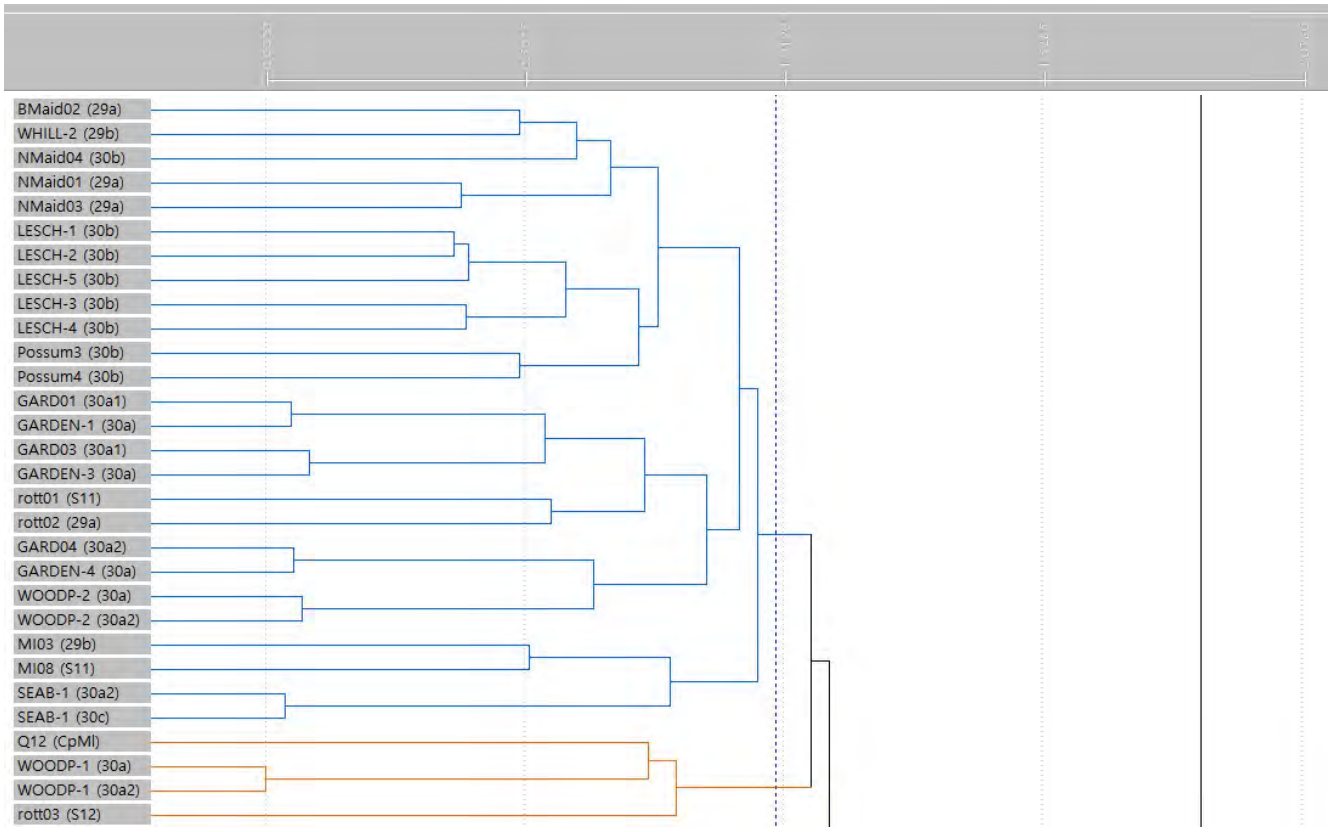
Species	Height (m)	% Cover
Spinifex longifolius	0.8	50
Scaevola crassifolia	0.3	15
Acanthocarpus preissii		+
Asphodelus fistulosus		+
Dittrichia graveolens		+
Trachyandra divaricata		+

APPENDIX E – BATCH AND SSI DENDROGRAMS

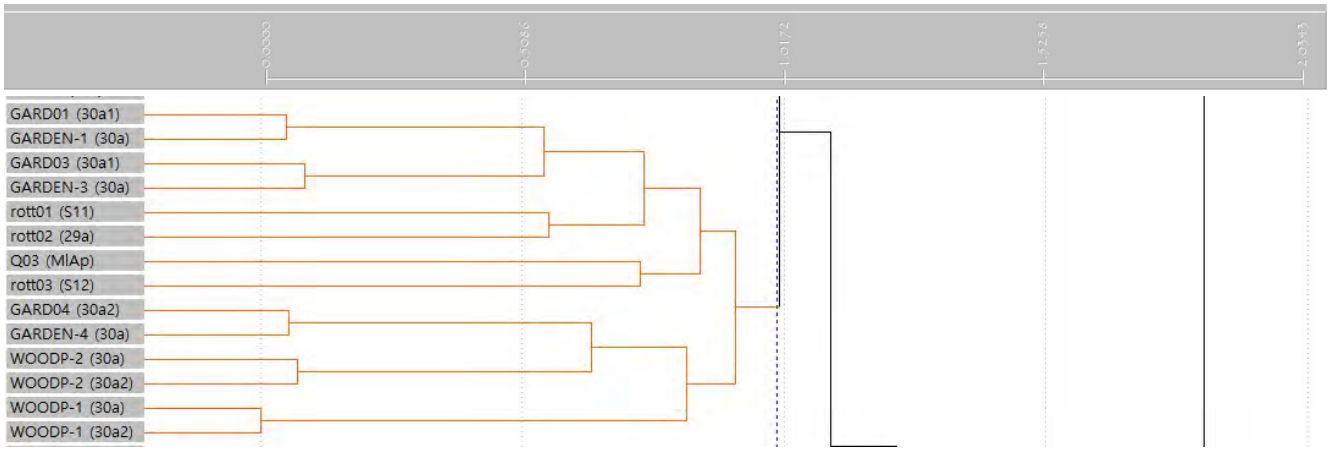
Dendrogram 1 – Excerpt Batch Analysis RIA Quadrats



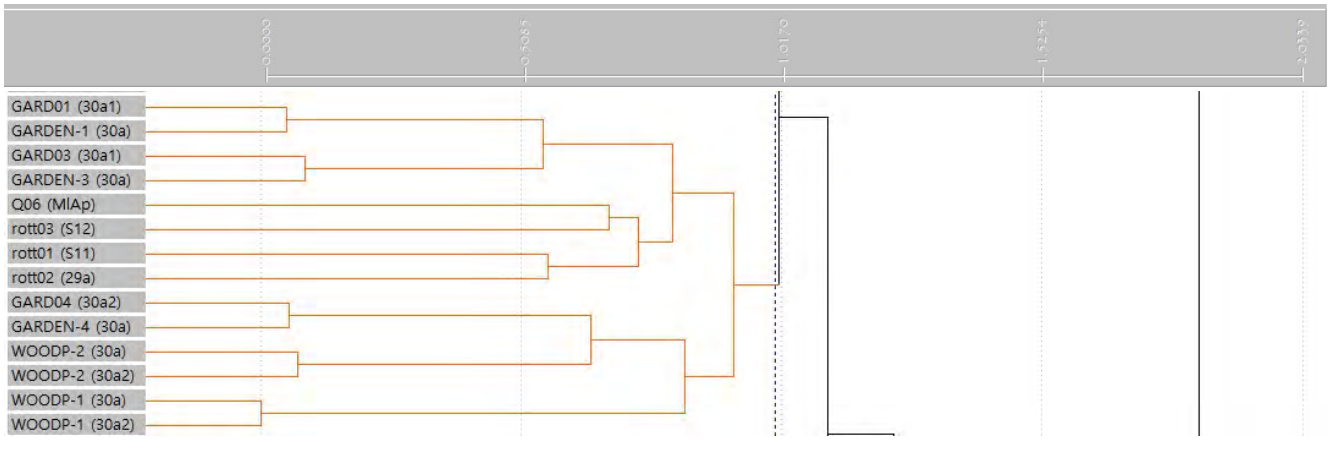
Dendrogram 2– CpMl SSI Q12



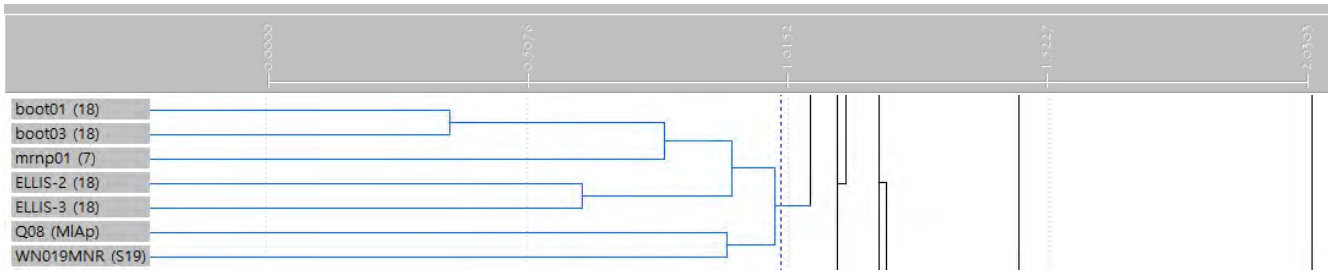
Dendrogram 3 – MlAp SSI Q03



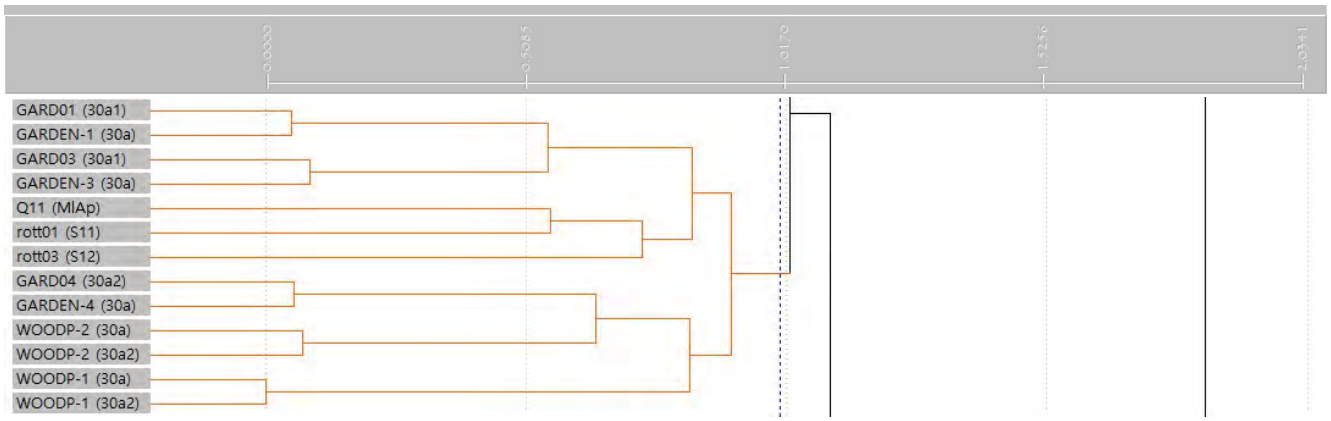
Dendrogram 4 – MlAp SSI Q06



Dendrogram 5 – MlAp SSI Q08



Dendrogram 6– MlAp SSI Q11



Appendix C
Protected Matters Search Tool Results (EPBC Act)

Australian Government
Department of Agriculture, Water and the Environment

EPBC Act Protected Matters Report

This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected. Please see the caveat for interpretation of information provided here.

Report created: 18-Mar-2022

Summary

Matters of National Environment Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the Administrative Guidelines on Significance.

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance (Ramsar	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	1
Listed Threatened Species:	38
Listed Migratory Species:	65

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at http://www.environment.gov.au/heritage

A permit may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Lands:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	93
Whales and Other Cetaceans:	12
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Australian Marine Parks:	None
Habitat Critical to the Survival of Marine Turtles:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have

State and Territory Reserves:	1
Regional Forest Agreements:	None
Nationally Important Wetlands:	1
EPBC Act Referrals:	3
Key Ecological Features (Marine):	None
Biologically Important Areas:	13
Bioregional Assessments:	None
Geological and Bioregional Assessments:	None

Details

Matters of National Environmental Significance

Listed Threatened Ecological Communities [Resource Information]

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.
Status of Vulnerable, Disallowed and Ineligible are not MNES under the EPBC Act.

Community Name	Threatened Category	Presence Text	Buffer Status
Banksia Woodlands of the Swan Coastal Plain ecological community	Endangered	Community may occur within area	In feature area

Listed Threatened Species [Resource Information]

Status of Conservation Dependent and Extinct are not MNES under the EPBC Act.
Number is the current name ID.

Scientific Name	Threatened Category	Presence Text	Buffer Status
BIRD			
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Limosa lapponica menzbieri Northern Siberian Bar-tailed Godwit, Russkoye Bar-tailed Godwit [86432]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Pachyptila turtur subantarctica Fairy Prion (southern) [64445]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Sternula nereis nereis](#) Australian Fairy Tern [82950]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Thalassarche carteri](#) Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
[Thalassarche cauta](#) Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
[Thalassarche impavida](#) Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche melanophris](#) Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
[Thalassarche steadi](#) White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
FISH			
[Thunnus maccoyii](#) Southern Bluefin Tuna [69402]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area
INSECT			
[Hesperocolletes douglasi](#) Douglas' Broad-headed Bee, Rottnest Bee [66734]	Critically Endangered	Species or species habitat may occur within area	In feature area
MAMMAL			
[Balaenoptera musculus](#) Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
[Eubalaena australis](#) Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
[Setonix brachyurus](#) Quokka [229]	Vulnerable	Species or species habitat known to occur within area	In feature area
PLANT			
[Diuris micrantha](#) Dwarf Bee-orchid [55082]	Vulnerable	Species or species habitat may occur within area	In feature area
REPTILE			
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Dermochelys coriacea](#) Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
SHARK			
[Carcharias taurus (west coast population)](#) Grey Nurse Shark (west coast population) [68752]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Carcharodon carcharias](#) White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rhincodon typus			
Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Sphyrna lewini			
Scalloped Hammerhead [85267]	Conservation Dependent	Species or species habitat likely to occur within area	In feature area

Listed Migratory Species [Resource Information]

Scientific Name	Threatened Category	Presence Text	Buffer Status
Migratory Marine Birds			
Anous stolidus			
Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Ardenna carneipes			
Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna pacifica			
Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In feature area
Diomedea amsterdamensis			
Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora			
Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans			
Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi			
Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Hydroprogne caspia			
Caspian Tern [808]		Breeding known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Onychoprion anaethetus Bridled Tern [82845]		Breeding known to occur within area	In feature area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area	In feature area
Sterna dougallii Roseate Tern [817]		Breeding known to occur within area	In feature area
Thalassarche carteri Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Migratory Marine Species			
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area
Carcharhinus longimanus Oceanic Whitetip Shark [84108]		Species or species habitat may occur within area	In feature area
Carcharodon carcharias White Shark, Great White Shark [64470]	Vulnerable	Species or species habitat known to occur within area	In feature area
Caretta caretta Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
Chelonia mydas Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Eubalaena australis as Balaena glacialis australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area
Lamna nasus Porbeagle, Mackerel Shark [83288]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Mobula alfredi as Manta alfredi Reef Manta Ray, Coastal Manta Ray [90033]		Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Mobula birostris as Manta birostris](#) Giant Manta Ray [90034]		Species or species habitat may occur within area	In feature area
[Natator depressus](#) Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
[Orcinus orca](#) Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
[Pristis pristis](#) Freshwater Sawfish, Largetooth Sawfish, River Sawfish, Leichhardt's Sawfish, Northern Sawfish [60756]	Vulnerable	Species or species habitat may occur within area	In feature area
[Rhincodon typus](#) Whale Shark [66680]	Vulnerable	Species or species habitat may occur within area	In feature area
Migratory Terrestrial Species			
[Motacilla cinerea](#) Grey Wagtail [642]		Species or species habitat may occur within area	In feature area
Migratory Wetlands Species			
[Actitis hypoleucos](#) Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
[Arenaria interpres](#) Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
[Calidris acuminata](#) Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
[Calidris alba](#) Sanderling [875]		Roosting known to occur within area	In feature area
[Calidris canutus](#) Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area	In feature area
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area	In feature area
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Numenius phaeopus](#) Whimbrel [849]		Roosting known to occur within area	In feature area
[Pandion haliaetus](#) Osprey [952]		Breeding known to occur within area	In feature area
[Phalaropus lobatus](#) Red-necked Phalarope [838]		Roosting known to occur within area	In feature area
[Pluvialis fulva](#) Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
[Pluvialis squatarola](#) Grey Plover [865]		Roosting known to occur within area	In feature area
[Thalasseus bergii](#) Greater Crested Tern [83000]		Breeding known to occur within area	In feature area
[Tringa brevipes](#) Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area	In feature area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area	In feature area
[Tringa totanus](#) Common Redshank, Redshank [835]		Roosting known to occur within area	In feature area
[Xenus cinereus](#) Terek Sandpiper [59300]		Roosting known to occur within area	In feature area

Other Matters Protected by the EPBC Act

Listed Marine Species			[Resource Information]
Scientific Name	Threatened Category	Presence Text	Buffer Status
Bird			

Scientific Name	Threatened Category	Presence Text	Buffer Status
Actitis hypoleucos Common Sandpiper [59309]		Species or species habitat known to occur within area	In feature area
Anous stolidus Common Noddy [825]		Species or species habitat likely to occur within area	In feature area
Anous tenuirostris melanops Australian Lesser Noddy [26000]	Vulnerable	Species or species habitat may occur within area	In feature area
Ardenna carneipes as Puffinus carneipes Flesh-footed Shearwater, Fleshy-footed Shearwater [82404]		Species or species habitat likely to occur within area	In feature area
Ardenna pacifica as Puffinus pacificus Wedge-tailed Shearwater [84292]		Breeding known to occur within area	In feature area
Arenaria interpres Ruddy Turnstone [872]		Roosting known to occur within area	In feature area
Calidris acuminata Sharp-tailed Sandpiper [874]		Roosting known to occur within area	In feature area
Calidris alba Sanderling [875]		Roosting known to occur within area	In feature area
Calidris canutus Red Knot, Knot [855]	Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat known to occur within area overfly marine area	In feature area
Calidris melanotos Pectoral Sandpiper [858]		Species or species habitat known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Calidris ruficollis Red-necked Stint [860]		Roosting known to occur within area overfly marine area	In feature area
Calidris tenuirostris Great Knot [862]	Critically Endangered	Roosting known to occur within area overfly marine area	In feature area
Charadrius bicinctus Double-banded Plover [895]		Roosting known to occur within area overfly marine area	In feature area
Charadrius leschenaultii Greater Sand Plover, Large Sand Plover [877]	Vulnerable	Species or species habitat known to occur within area	In feature area
Charadrius mongolus Lesser Sand Plover, Mongolian Plover [879]	Endangered	Roosting known to occur within area	In feature area
Charadrius ruficapillus Red-capped Plover [881]		Roosting known to occur within area overfly marine area	In feature area
Chroicocephalus novaehollandiae as Larus novaehollandiae Silver Gull [82326]		Breeding known to occur within area	In feature area
Diomedea amsterdamensis Amsterdam Albatross [64405]	Endangered	Species or species habitat may occur within area	In feature area
Diomedea epomophora Southern Royal Albatross [89221]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea exulans Wandering Albatross [89223]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Diomedea sanfordi Northern Royal Albatross [64456]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Gallinago megala Swinhoe's Snipe [864]		Roosting likely to occur within area overfly marine area	In feature area
Gallinago stenura Pin-tailed Snipe [841]		Roosting likely to occur within area overfly marine area	In feature area
Haliaeetus leucogaster White-bellied Sea-Eagle [943]		Species or species habitat may occur within area	In feature area
Himantopus himantopus Pied Stilt, Black-winged Stilt [870]		Roosting known to occur within area overfly marine area	In feature area
Hydroprogne caspia as Sterna caspia Caspian Tern [808]		Breeding known to occur within area	In feature area
Larus pacificus Pacific Gull [811]		Foraging, feeding or related behaviour may occur within area	In feature area
Limosa lapponica Bar-tailed Godwit [844]		Species or species habitat known to occur within area	In feature area
Limosa limosa Black-tailed Godwit [845]		Roosting known to occur within area overfly marine area	In feature area
Macronectes giganteus Southern Giant-Petrel, Southern Giant Petrel [1060]	Endangered	Species or species habitat may occur within area	In feature area
Macronectes halli Northern Giant Petrel [1061]	Vulnerable	Species or species habitat may occur within area	In feature area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Numenius madagascariensis Eastern Curlew, Far Eastern Curlew [847]	Critically Endangered	Species or species habitat likely to occur within area	In feature area
Numenius minutus Little Curlew, Little Whimbrel [848]		Roosting likely to occur within area overfly marine area	In feature area
Numenius phaeopus Whimbrel [849]		Roosting known to occur within area	In feature area
Onychoprion anaethetus as Sterna anaethetus Bridled Tern [82845]		Breeding known to occur within area	In feature area
Onychoprion fuscatus as Sterna fuscata Sooty Tern [90682]		Breeding known to occur within area	In feature area
Pachyptila turtur Fairy Prion [1066]		Species or species habitat likely to occur within area	In feature area
Pandion haliaetus Osprey [952]		Breeding known to occur within area	In feature area
Phaethon rubricauda Red-tailed Tropicbird [994]		Breeding known to occur within area	In feature area
Phalaropus lobatus Red-necked Phalarope [838]		Roosting known to occur within area	In feature area
Pluvialis fulva Pacific Golden Plover [25545]		Roosting known to occur within area	In feature area
Pluvialis squatarola Grey Plover [865]		Roosting known to occur within area overfly marine area	In feature area
Puffinus assimilis Little Shearwater [59363]		Breeding known to occur within area	In feature area
Recurvirostra novaehollandiae Red-necked Avocet [871]		Roosting known to occur within area overfly marine area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Rostratula australis as Rostratula benghalensis (sensu lato)			
Australian Painted Snipe [77037]	Endangered	Species or species habitat may occur within area overfly marine area	In feature area
Sterna dougallii			
Roseate Tern [817]		Breeding known to occur within area	In feature area
Sternula nereis as Sterna nereis			
Fairy Tern [82949]		Breeding known to occur within area	In feature area
Thalassarche carteri			
Indian Yellow-nosed Albatross [64464]	Vulnerable	Species or species habitat likely to occur within area	In feature area
Thalassarche cauta			
Shy Albatross [89224]	Endangered	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalassarche impavida			
Campbell Albatross, Campbell Black-browed Albatross [64459]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche melanophris			
Black-browed Albatross [66472]	Vulnerable	Species or species habitat may occur within area	In feature area
Thalassarche steadi			
White-capped Albatross [64462]	Vulnerable	Foraging, feeding or related behaviour likely to occur within area	In feature area
Thalasseus bergii as Sterna bergii			
Greater Crested Tern [83000]		Breeding known to occur within area	In feature area
Thinornis cucullatus as Thinornis rubricollis			
Hooded Dotterel, Hooded Plover [87735]		Species or species habitat known to occur within area overfly marine area	In feature area
Tringa brevipes as Heteroscelus brevipes			
Grey-tailed Tattler [851]		Roosting known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Tringa nebularia](#) Common Greenshank, Greenshank [832]		Species or species habitat known to occur within area overfly marine area	In feature area
[Tringa stagnatilis](#) Marsh Sandpiper, Little Greenshank [833]		Roosting known to occur within area overfly marine area	In feature area
[Tringa totanus](#) Common Redshank, Redshank [835]		Roosting known to occur within area overfly marine area	In feature area
[Xenus cinereus](#) Terek Sandpiper [59300]		Roosting known to occur within area overfly marine area	In feature area
Fish			
[Acentronura australe](#) Southern Pygmy Pipehorse [66185]		Species or species habitat may occur within area	In feature area
[Campichthys galei](#) Gale's Pipefish [66191]		Species or species habitat may occur within area	In feature area
[Heraldia nocturna](#) Upside-down Pipefish, Eastern Upside-down Pipefish, Eastern Upside-down Pipefish [66227]		Species or species habitat may occur within area	In feature area
[Hippocampus angustus](#) Western Spiny Seahorse, Narrow-bellied Seahorse [66234]		Species or species habitat may occur within area	In feature area
[Hippocampus breviceps](#) Short-head Seahorse, Short-snouted Seahorse [66235]		Species or species habitat may occur within area	In feature area
[Hippocampus subelongatus](#) West Australian Seahorse [66722]		Species or species habitat may occur within area	In feature area
[Histiogamphelus cristatus](#) Rhino Pipefish, Macleay's Crested Pipefish, Ring-back Pipefish [66243]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Lissocampus caudalis Australian Smooth Pipefish, Smooth Pipefish [66249]		Species or species habitat may occur within area	In feature area
Lissocampus fatiloquus Prophet's Pipefish [66250]		Species or species habitat may occur within area	In feature area
Lissocampus runa Javelin Pipefish [66251]		Species or species habitat may occur within area	In feature area
Maroubra perserrata Sawtooth Pipefish [66252]		Species or species habitat may occur within area	In feature area
Mitotichthys meraculus Western Crested Pipefish [66259]		Species or species habitat may occur within area	In feature area
Nannocampus subosseus Bonyhead Pipefish, Bony-headed Pipefish [66264]		Species or species habitat may occur within area	In feature area
Phycodurus eques Leafy Seadragon [66267]		Species or species habitat may occur within area	In feature area
Phyllopteryx taeniolatus Common Seadragon, Weedy Seadragon [66268]		Species or species habitat may occur within area	In feature area
Pugnaso curtirostris Pugnose Pipefish, Pug-nosed Pipefish [66269]		Species or species habitat may occur within area	In feature area
Solegnathus lettiensis Gunther's Pipehorse, Indonesian Pipefish [66273]		Species or species habitat may occur within area	In feature area
Stigmatopora argus Spotted Pipefish, Gulf Pipefish, Peacock Pipefish [66276]		Species or species habitat may occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
[Stigmatopora nigra](#) Widebody Pipefish, Wide-bodied Pipefish, Black Pipefish [66277]		Species or species habitat may occur within area	In feature area
[Urocampus carinirostris](#) Hairy Pipefish [66282]		Species or species habitat may occur within area	In feature area
[Vanacampus margaritifer](#) Mother-of-pearl Pipefish [66283]		Species or species habitat may occur within area	In feature area
[Vanacampus phillipi](#) Port Phillip Pipefish [66284]		Species or species habitat may occur within area	In feature area
[Vanacampus poecilolaemus](#) Longsnout Pipefish, Australian Long-snout Pipefish, Long-snouted Pipefish [66285]		Species or species habitat may occur within area	In feature area
Mammal			
[Arctocephalus forsteri](#) Long-nosed Fur-seal, New Zealand Fur-seal [20]		Species or species habitat may occur within area	In feature area
[Neophoca cinerea](#) Australian Sea-lion, Australian Sea Lion [22]	Endangered	Species or species habitat likely to occur within area	In feature area
Reptile			
[Aipysurus pooleorum](#) Shark Bay Seasnake [66061]		Species or species habitat may occur within area	In feature area
[Caretta caretta](#) Loggerhead Turtle [1763]	Endangered	Foraging, feeding or related behaviour known to occur within area	In feature area
[Chelonia mydas](#) Green Turtle [1765]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area

Scientific Name	Threatened Category	Presence Text	Buffer Status
Dermochelys coriacea Leatherback Turtle, Leathery Turtle, Luth [1768]	Endangered	Species or species habitat known to occur within area	In feature area
Disteira kingii Spectacled Seasnake [1123]		Species or species habitat may occur within area	In feature area
Natator depressus Flatback Turtle [59257]	Vulnerable	Foraging, feeding or related behaviour known to occur within area	In feature area
Pelamis platurus Yellow-bellied Seasnake [1091]		Species or species habitat may occur within area	In feature area

Whales and Other Cetaceans			[Resource Information]
Current Scientific Name	Status	Type of Presence	Buffer Status
Mammal			
Balaenoptera acutorostrata Minke Whale [33]		Species or species habitat may occur within area	In feature area
Balaenoptera edeni Bryde's Whale [35]		Species or species habitat may occur within area	In feature area
Balaenoptera musculus Blue Whale [36]	Endangered	Species or species habitat likely to occur within area	In feature area
Caperea marginata Pygmy Right Whale [39]		Species or species habitat may occur within area	In feature area
Delphinus delphis Common Dolphin, Short-beaked Common Dolphin [60]		Species or species habitat may occur within area	In feature area
Eubalaena australis Southern Right Whale [40]	Endangered	Breeding known to occur within area	In feature area

Current Scientific Name	Status	Type of Presence	Buffer Status
Grampus griseus Risso's Dolphin, Grampus [64]		Species or species habitat may occur within area	In feature area
Megaptera novaeangliae Humpback Whale [38]		Species or species habitat known to occur within area	In feature area
Orcinus orca Killer Whale, Orca [46]		Species or species habitat may occur within area	In feature area
Stenella attenuata Spotted Dolphin, Pantropical Spotted Dolphin [51]		Species or species habitat may occur within area	In feature area
Tursiops aduncus Indian Ocean Bottlenose Dolphin, Spotted Bottlenose Dolphin [68418]		Species or species habitat likely to occur within area	In feature area
Tursiops truncatus s. str. Bottlenose Dolphin [68417]		Species or species habitat may occur within area	In feature area

Extra Information

State and Territory Reserves			[Resource Information]
Protected Area Name	Reserve Type	State	Buffer Status
Rottnest Island	State Reserve	WA	In feature area

Nationally Important Wetlands		[Resource Information]
Wetland Name	State	Buffer Status
Rottnest Island Lakes	WA	In feature area

EPBC Act Referrals				[Resource Information]
Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				
INDIGO Central Submarine Telecommunications Cable	2017/8127	Not Controlled Action	Completed	In feature area
Rottnest Lodge Redevelopment	2019/8565	Not Controlled Action	Completed	In buffer area only
Seismic Survey, Bremer Basin, Mentelle Basin and Zeewyck Sub-basin	2004/1700	Not Controlled Action	Completed	In feature area

Title of referral	Reference	Referral Outcome	Assessment Status	Buffer Status
Not controlled action				

Biologically Important Areas

Scientific Name	Behaviour	Presence	Buffer Status
Seabirds			
Ardenna carneipes Flesh-footed Shearwater [82404]	Aggregation	Known to occur	In feature area
Ardenna pacifica Wedge-tailed Shearwater [84292]	Foraging (in high numbers)	Known to occur	In feature area
Eudyptula minor Little Penguin [1085]	Foraging (provisioning young)	Known to occur	In feature area
Hydroprogne caspia Caspian Tern [808]	Foraging (provisioning young)	Known to occur	In feature area
Larus pacificus Pacific Gull [811]	Foraging (in high numbers)	Former Range	In feature area
Onychoprion anaethetus Bridled Tern [82845]	Foraging (in high numbers)	Known to occur	In feature area
Puffinus assimilis tunneyi Little Shearwater [59363]	Foraging (in high numbers)	Known to occur	In feature area
Sterna dougallii Roseate Tern [817]	Foraging	Known to occur	In feature area
Sternula nereis Fairy Tern [82949]	Foraging (in high numbers)	Known to occur	In feature area
Seals			
Neophoca cinerea Australian Sea Lion [22]	Foraging (male)	Likely to occur	In feature area
Whales			

Scientific Name	Behaviour	Presence	Buffer Status
Balaenoptera musculus brevicauda Pygmy Blue Whale [81317]	Distribution	Known to occur	In feature area
Eubalaena australis Southern Right Whale [40]	Calving buffer	Known to occur	In feature area
Megaptera novaeangliae Humpback Whale [38]	Migration (north and south)	Known to occur	In feature area

Caveat

1 PURPOSE

This report is designed to assist in identifying the location of matters of national environmental significance (MNES) and other matters protected by the Environment Protection and Biodiversity Conservation Act 1999 (Cth) (EPBC Act) which may be relevant in determining obligations and requirements under the EPBC Act.

The report contains the mapped locations of:

- World and National Heritage properties;
- Wetlands of International and National Importance;
- Commonwealth and State/Territory reserves;
- distribution of listed threatened, migratory and marine species;
- listed threatened ecological communities; and
- other information that may be useful as an indicator of potential habitat value.

2 DISCLAIMER

This report is not intended to be exhaustive and should only be relied upon as a general guide as mapped data is not available for all species or ecological communities listed under the EPBC Act (see below). Persons seeking to use the information contained in this report to inform the referral of a proposed action under the EPBC Act should consider the limitations noted below and whether additional information is required to determine the existence and location of MNES and other protected matters.

Where data are available to inform the mapping of protected species, the presence type (e.g. known, likely or may occur) that can be determined from the data is indicated in general terms. It is the responsibility of any person using or relying on the information in this report to ensure that it is suitable for the circumstances of any proposed use. The Commonwealth cannot accept responsibility for the consequences of any use of the report or any part thereof. To the maximum extent allowed under governing law, the Commonwealth will not be liable for any loss or damage that may be occasioned directly or indirectly through the use of, or reliance

3 DATA SOURCES

Threatened ecological communities

For threatened ecological communities where the distribution is well known, maps are generated based on information contained in recovery plans, State vegetation maps and remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

Threatened, migratory and marine species

Threatened, migratory and marine species distributions have been discerned through a variety of methods. Where distributions are well known and if time permits, distributions are inferred from either thematic spatial data (i.e. vegetation, soils, geology, elevation, aspect, terrain, etc.) together with point locations and described habitat; or modelled (MAXENT or BIOCLIM habitat modelling) using

Where little information is available for a species or large number of maps are required in a short time-frame, maps are derived either from 0.04 or 0.02 decimal degree cells; by an automated process using polygon capture techniques (static two kilometre grid cells, alpha-hull and convex hull); or captured manually or by using topographic features (national park boundaries, islands, etc.).

In the early stages of the distribution mapping process (1999-early 2000s) distributions were defined by degree blocks, 100K or 250K map sheets to rapidly create distribution maps. More detailed distribution mapping methods are used to update these distributions

4 LIMITATIONS

The following species and ecological communities have not been mapped and do not appear in this report:

- threatened species listed as extinct or considered vagrants;
- some recently listed species and ecological communities;
- some listed migratory and listed marine species, which are not listed as threatened species; and
- migratory species that are very widespread, vagrant, or only occur in Australia in small numbers.

The following groups have been mapped, but may not cover the complete distribution of the species:

- listed migratory and/or listed marine seabirds, which are not listed as threatened, have only been mapped for recorded
- seals which have only been mapped for breeding sites near the Australian continent

The breeding sites may be important for the protection of the Commonwealth Marine environment.

Refer to the metadata for the feature group (using the Resource Information link) for the currency of the information.

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

-Office of Environment and Heritage, New South Wales
-Department of Environment and Primary Industries, Victoria
-Department of Primary Industries, Parks, Water and Environment, Tasmania
-Department of Environment, Water and Natural Resources, South Australia
-Department of Land and Resource Management, Northern Territory
-Department of Environmental and Heritage Protection, Queensland
-Department of Parks and Wildlife, Western Australia
-Environment and Planning Directorate, ACT
-Birdlife Australia
-Australian Bird and Bat Banding Scheme
-Australian National Wildlife Collection
-Natural history museums of Australia
-Museum Victoria
-Australian Museum
-South Australian Museum
-Queensland Museum
-Online Zoological Collections of Australian Museums
-Queensland Herbarium
-National Herbarium of NSW
-Royal Botanic Gardens and National Herbarium of Victoria
-Tasmanian Herbarium
-State Herbarium of South Australia
-Northern Territory Herbarium
-Western Australian Herbarium
-Australian National Herbarium, Canberra
-University of New England
-Ocean Biogeographic Information System
-Australian Government, Department of Defence
Forestry Corporation, NSW
-Geoscience Australia
-CSIRO
-Australian Tropical Herbarium, Cairns
-eBird Australia
-Australian Government – Australian Antarctic Data Centre
-Museum and Art Gallery of the Northern Territory
-Australian Government National Environmental Science Program
-Australian Institute of Marine Science
-Reef Life Survey Australia
-American Museum of Natural History
-Queen Victoria Museum and Art Gallery, Inveresk, Tasmania
-Tasmanian Museum and Art Gallery, Hobart, Tasmania
-Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the Contact Us page.

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Appendix D
NatureMap Search Results

NatureMap
Mapping Western Australia's biodiversity

Rottnest Island 10km Buffer Report

Created By Guest user on 21/03/2022

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 32' 42" E,32° 00' 07" S
Buffer 10km
Group By Kingdom

Kingdom	Species	Records
Animalia	698	11597
Bacteria	1	1
Chromista	73	284
Fungi	17	18
Plantae	552	1838
Protozoa	2	2
TOTAL	**1343**	**13740**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Animalia					
1.		*? ?*			
2.		*Ablennes hians*			
3.		*Abudefduf saxatilis*			
4.		*Abudefduf sexfasciatus*			
5.		*Acanthaluteres brownii*			
6.		*Acanthaluteres vittiger*			
7.		*Acanthistius pardalotus*			
8.		*Acanthistius serratus*			
9.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
10.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
11.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
12.	25536	*Accipiter fasciatus (Brown Goshawk)*			
13.		*Achelia assimilis*			Y
14.		*Achelia shepherdi*			
15.		*Achoerodus gouldii*			
16.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
17.		*Actacarus australis*			Y
18.		*Actacarus marindicus*			Y
19.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
20.		*Agaue brevipes*			
21.		*Agaue circellaris*			Y
22.		*Agaue scita*			Y
23.		*Agaue tenuipes*			
24.		*Agauopsis aequilivestita*			Y
25.		*Agauopsis australiensis*			Y
26.		*Agauopsis elaborata*			Y
27.		*Agauopsis ornatella*			Y
28.		*Alabes brevis*			
29.		*Alabes brevis?*			Y
30.		*Alabes gibbosa*			
31.		*Alabes occidentalis*			
32.		*Allomycterus pilatus*			
33.		*Allothereua maculata*			
34.		*Amblygobius phalaena*			
35.		*Amblyomma albolimbatum*			
36.		*Amblyomma triguttatum*			
37.		*Ammothella biunguiculata subsp. australiensis*			
38.		*Amniataba caudavittata*			
39.		*Aname mainae*			
40.		*Anampses caeruleopunctatus*			
41.		*Anampses geographicus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
42.	24310	*Anas castanea (Chestnut Teal)*			
43.	24312	*Anas gracilis (Grey Teal)*			
44.	24315	*Anas rhynchotis (Australasian Shoveler)*			
45.	24316	*Anas superciliosa (Pacific Black Duck)*			
46.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
47.		*Anomalohalacarus macellus*			Y
48.		*Anoplocapros amygdaloides?*			
49.		*Anoplocapros lenticularis*			
50.		*Anoplocapros robustus*			
51.		*Anoplodactylus tenuicorpus*			Y
52.	25634	*Anous stolidus (Common Noddy)*		IA	
53.		*Antennarius nummifer*			
54.	24561	*Anthochaera carunculata (Red Wattlebird)*			
55.	25670	*Anthus australis (Australian Pipit)*			
56.	24599	*Anthus australis subsp. australis (Australian Pipit)*			
57.		*Apogon rueppellii*			
58.		*Apogon victoriae*			
59.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
60.		*Aptychotrema sp.*			
61.	25554	*Apus pacificus (Fork-tailed Swift, Pacific Swift)*		IA	
62.		*Aracana aurita*			
63.		*Araneus senicaudatus*			
64.	24208	*Arctocephalus forsteri (New Zealand Fur Seal, long-nosed fur-seal)*		S	
65.	41324	*Ardea modesta (great egret, white egret)*			
66.	41326	*Ardenna carneipes (Flesh-footed Shearwater, Fleshy-footed Shearwater)*		T	
67.	48573	*Ardenna pacifica (Wedge-tailed Shearwater)*		IA	
68.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
69.	24778	*Arenaria interpres subsp. interpres (Ruddy Turnstone)*		IA	
70.		*Argyrodes antipodianus*			
71.		*Arhodeoporus disparilis*			Y
72.		*Arhodeoporus psammophilus*			
73.		*Arhodeoporus wadjemupis*			Y
74.		*Arothron sp.*			
75.		*Aspasmogaster occidentalis*			
76.		*Atherinomorus vaigiensis*			
77.		*Atherinosoma presbyteroides*			
78.		*Aulohalaelurus labiosus*			
79.		*Aulopus purpurissatus*			
80.		*Austracantha minax*			
81.		*Australacarus pustulatus*			
82.		*Austrolabrus maculatus*			
83.	47713	*Austronomus australis (White-striped Free-tailed Bat)*			
84.		*Auxis thazard*			
85.	24044	*Balaenoptera acutorostrata (Dwarf Minke Whale)*			
86.	24048	*Balaenoptera musculus subsp. brevicauda (Pygmy Blue Whale)*		T	
87.		*Balaenoptera sp.*			
88.		*Balistoides viridescens*			
89.		*Ballarra longipalpus*			
90.		*Barbuligobius boehlkei*			
91.		*Barnardius zonarius*			
92.		*Bathophilus nigerrimus*			Y
93.		*Batrachomoeus rubricephalus*			
94.		*Beliops xanthokrossos*			
95.		*Belonepterygion fasciolatum*			
96.		*Bianor maculatus*			
97.		*Bodianus frenchii*			
98.		*Bodianus vulpinus*			
99.		*Brachaluteres jacksonianus*			
100.		*Bradyagaue scutella*			Y
101.		*Branchiostegus australiensis?*			Y
102.		*Bythitid sp.*			
103.	25715	*Cacatua roseicapilla (Galah)*			
104.	25716	*Cacatua sanguinea (Little Corella)*			
105.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
106.	24427	*Cacomantis flabelliformis subsp. flabelliformis (Fan-tailed Cuckoo)*			
107.		*Caesioperca immaculata (ms)*			
108.		*Caesioscorpis sp.*			Y
109.		*Caesioscorpis theagenes*			
110.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
111.	24780	*Calidris alba (Sanderling)*		IA	

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
112.	25738	*Calidris canutus (Red Knot, knot)*		IA	
113.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
114.	24786	*Calidris melanotos (Pectoral Sandpiper)*		IA	
115.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
116.	24789	*Calidris subminuta (Long-toed Stint)*		IA	
117.	24790	*Calidris tenuirostris (Great Knot)*		T	
118.		*Callogobius depressus*			
119.		*Callogobius mucosus*			
120.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
121.		*Campichthys galei*			
122.		*Caprichthys gymnura*			
123.		*Caprodon sp.*			
124.		*Capropygia unistriata*			
125.		*Caranx sp.*			
126.		*Carcharhinus brevipinna*			
127.		*Carcharhinus obscurus*			
128.		*Carcharhinus sp.*			
129.	34031	*Carcharodon carcharias (Great White Shark)*		T	
130.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
131.		*Centroberyx gerrardi*			
132.		*Centropogon australis*			
133.		*Centropogon latifrons*			
134.		*Cephaloscyllium laticeps*			
135.		*Chaetodermis penicilligera*			
136.		*Chaetodermis sp.*			Y
137.		*Chaetodon assarius*			
138.		*Chaetodon lunula*			
139.	25574	*Charadrius dubius (Little Ringed Plover)*		IA	
140.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		T	
141.	25576	*Charadrius mongolus (Lesser Sand Plover)*		T	
142.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
143.		*Cheilodactylus gibbosus*			
144.		*Cheilodactylus rubrolabiatus*			
145.		*Cheilopogon sp.*			
146.		*Chelidonichthys kumu*			
147.		*Chelmonops curiosus*			
148.	25336	*Chelonia mydas (Green Turtle)*		T	
149.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
150.		*Cherax sp.*			
151.	41332	*Chlidonias leucopterus (White-winged Black Tern, white-winged tern)*		IA	
152.		*Choerodon sp.*			
153.	24980	*Christinus marmoratus (Marbled Gecko)*			
154.		*Chroicocephalus novaehollandiae*			
155.		*Chromis klunzingeri*			
156.		*Chromis sp.*			
157.		*Chromis westaustralis*			
158.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
159.		*Chyzeria occidentalis*			Y
160.	24288	*Circus approximans (Swamp Harrier)*			
161.		*Cirripectes hutchinsi*			
162.		*Cirripectes sp.*			
163.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
164.		*Cleidopus gloriamaris*			
165.		*Cnidoglanis macrocephalus*			
166.		*Cochleoceps bicolor*			
167.		*Cochleoceps viridis*			
168.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
169.	24399	*Columba livia (Domestic Pigeon)*	Y		
170.		*Conger sp.*			
171.		*Conger wilsoni*			
172.		*Copidognathus amalus*			Y
173.		*Copidognathus amaurus*			Y
174.		*Copidognathus ampliatus*			Y
175.		*Copidognathus attalus*			Y
176.		*Copidognathus australensis*			Y
177.		*Copidognathus bispinus*			Y
178.		*Copidognathus bistriatus*			Y
179.		*Copidognathus caelatus*			Y
180.		*Copidognathus canaliculifer*			Y

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
181.		*Copidognathus crassispinus*			Y
182.		*Copidognathus cribellus*			Y
183.		*Copidognathus culoatus*			Y
184.		*Copidognathus dictyotus*			Y
185.		*Copidognathus dubiosus*			Y
186.		*Copidognathus facetus*			Y
187.		*Copidognathus laeviusculus*			Y
188.		*Copidognathus laminifer*			Y
189.		*Copidognathus levigatus*			Y
190.		*Copidognathus majorinus*			Y
191.		*Copidognathus multiporus*			Y
192.		*Copidognathus nasutus*			Y
193.		*Copidognathus pumicatus*			Y
194.		*Copidognathus punctellus*			Y
195.		*Copidognathus rasilis*			Y
196.		*Copidognathus strigellus*			Y
197.		*Copidognathus vulgaris*			Y
198.		*Copidognathus wadjemupis*			Y
199.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
200.		*Coris auricularis*			
201.		*Cormocephalus aurantiipes*			
202.		*Cormocephalus rubriceps*			
203.		*Cormocephalus turneri*			
204.	25592	*Corvus coronoides (Australian Raven)*			
205.	24417	*Corvus coronoides subsp. perplexus (Australian Raven)*			
206.	24419	*Corvus splendens (House Crow)*			
207.		*Coryphaena hippurus*			
208.	25701	*Coturnix ypsilophora (Brown Quail)*			
209.	25595	*Cracticus tibicen (Australian Magpie)*			
210.	25596	*Cracticus torquatus (Grey Butcherbird)*			
211.		*Crapatalus arenarius*			
212.	25400	*Crinia insignifera (Squelching Froglet)*			
213.		*Cristiceps aurantiacus*			
214.		*Cristiceps australis*			
215.		*Cristiceps sp.*			
216.		*Cryptops australis*			Y
217.	25039	*Ctenotus fallens*			
218.	24322	*Cygnus atratus (Black Swan)*			
219.		*Cynoglossus sp.*			
220.		*Dactylophora nigricans*			
221.		*Daphnia carinata*			
222.	24687	*Daption capense (Cape Petrel)*			
223.		*Dasyatis brevicaudata*			
224.	24052	*Delphinus delphis (Common Dolphin)*			
225.		*Dermatopsis multiradiatus*			
226.	25346	*Dermochelys coriacea (Leatherback Turtle)*		T	
227.		*Desmodema polystictum*			Y
228.		*Dexillus muelleri*			
229.		*Dinematichthys dasyrynchus*			
230.		*Dinematichthys sp.*			
231.		*Dingosa serrata*			
232.		*Dinolestes lewini*			
233.		*Diodon nicthemerus*			
234.		*Diodon sp.*			
235.	25618	*Diomedea exulans (Wandering Albatross)*		T	
236.	30836	*Diomedea exulans subsp. exulans (Snowy Albatross)*		T	
237.		*Dipulus caecus*			
238.		*Dipulus cf. hutchinsi*			Y
239.		*Dipulus hutchinsi*			
240.		*Dotalabrus alleni*			
241.		*Dotalabrus sp.*			Y
242.		*Echeneis naucrates*			
243.		*Eeyorius hutchinsi*			
244.	25096	*Egernia kingii (King's Skink)*			
245.	25100	*Egernia napoleonis*			
246.		*Egretta novaehollandiae*			
247.		*Elanus axillaris*			
248.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
249.		*Enigmapercis sp.*			
250.		*Enoplosus armatus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
251.		*Entomacrodus striatus*			
252.		*Eolophus roseicapillus*			
253.		*Epinephelides armatus*			
254.		*Epinephelus lanceolatus*			
255.		*Epinephelus rivulatus*			
256.		*Epinephelus septemfasciata*			
257.	24567	*Epthianura albifrons (White-fronted Chat)*			
258.	24258	*Equus caballus (Horse)*	Y		
259.		*Eriophora biapicata*			
260.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
261.	47938	*Esacus magnirostris (Beach Stone-curlew, Beach Thick-knee)*			
262.	24043	*Eubalaena australis (Southern Right Whale)*		T	
263.		*Eubalichthys caeruleoguttatus*			
264.		*Eubalichthys mosaicus*			
265.	25746	*Eudyptula minor (Little Penguin)*			
266.		*Eupetrichthys angustipes*			
267.		*Eviota bimaculata*			
268.		*Eviota sp.*			
269.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
270.	24472	*Falco cenchroides subsp. cenchroides (Australian Kestrel, Nankeen Kestrel)*			
271.	25623	*Falco longipennis (Australian Hobby)*			
272.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
273.		*Favonigobius lateralis*			
274.	24041	*Felis catus (Cat)*	Y		
275.	24688	*Fulmarus glacialoides (Southern Fulmar)*			
276.		*Furgaleus macki*			
277.		*Galeorhinus galeus*			
278.	25730	*Gallirallus philippensis (Buff-banded Rail)*			
279.	42314	*Gavicalis virescens (Singing Honeyeater)*			
280.		*Geogarypus taylori*			
281.	25530	*Gerygone fusca (Western Gerygone)*			
282.		*Girella tephraeops*			
283.		*Girella zebra*			
284.	24481	*Glareola maldivarum (Oriental Pratincole)*		IA	
285.	24054	*Globicephala macrorhynchus (Short-finned Pilot Whale)*			
286.		*Gobiesocid sp.*			
287.		*Gonorynchus greyi*			
288.	24443	*Grallina cyanoleuca (Magpie-lark)*			
289.	24056	*Grampus griseus (Risso's Dolphin)*			
290.		*Gymnothorax prasinus*			
291.		*Gymnothorax sp.*			
292.		*Gymnothorax woodwardi*			
293.	25627	*Haematopus fuliginosus (Sooty Oystercatcher)*			
294.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
295.		*Halacarellus rottnestensis*			Y
296.		*Halacaropsis capuzina*			
297.		*Halacarus arenarius*			Y
298.		*Halacarus celatus*			Y
299.		*Halacarus discophorus*			
300.		*Halacarus flavellus*			
301.		*Halacarus fuscatus*			
302.		*Halacarus helenae*			
303.		*Halacarus mitrellus*			Y
304.		*Halacarus parvulus*			Y
305.		*Halacarus psammophilus*			Y
306.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
307.	24295	*Haliastur sphenurus (Whistling Kite)*			
308.		*Halichoeres brownfieldi*			
309.		*Helcogramma decurrens*			
310.	25410	*Heleioporus eyrei (Moaning Frog)*			
311.	25119	*Hemiergis quadrilineata*			
312.		*Hemiramphus sp.*			
313.		*Henicops dentatus*			
314.	33974	*Hesperocolletes douglasi (Douglas's Broad-headed Bee, Short-tongued Native Bee)*		T	
315.		*Heteroclinus adelaidae*			
316.		*Heteroclinus eckloniae*			
317.		*Heteroclinus equiradiatus*			Y
318.		*Heteroclinus heptaeolus*			
319.		*Heteroclinus nasutus*			
320.		*Heteroclinus roseus*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
321.		*Heteroclinus sp.*			
322.		*Heteroclinus whitleyi (ms)*			
323.		*Heterodontus portusjacksoni*			
324.	47965	*Hieraaetus morphnoides (Little Eagle)*			
325.	25734	*Himantopus himantopus (Black-winged Stilt)*			
326.		*Hippocampus sp.*			
327.	24491	*Hirundo neoxena (Welcome Swallow)*			
328.		*Histrio histrio*			
329.	42410	*Hydrophis ornatus (Ornate Reef Seasnake, Sea Snake)*			
330.	43384	*Hydrophis platurus (Yellow-bellied Seasnake)*			
331.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
332.	24211	*Hydrurga leptonyx (Leopard Seal)*			
333.		*Hypoplectrodes nigroruber*			
334.		*Hypoplectrodes wilsoni*			
335.		*Hyporhamphus melanochir*			
336.		*Ichthyscopus barbatus*			
337.		*Idiommata blackwalli*			
338.		*Iso rhothophilus*			
339.		*Isopeda leishmanni*			
340.		*Isurus oxyrinchus*			Y
341.		*Kathetostoma nigrofasciatum*			
342.		*Kuiterichthys sp.*			
343.		*Kyphosus bigibbus?*			
344.		*Kyphosus cornelii*			
345.		*Kyphosus gladius MS*			
346.		*Kyphosus sydneyanus*			
347.		*Labroides dimidiatus*			
348.		*Lactoria concatenatus*			
349.		*Lactoria sp.*			
350.		*Lagocephalus sceleratus*			
351.	24367	*Lalage tricolor (White-winged Triller)*			
352.	25637	*Larus novaehollandiae (Silver Gull)*			
353.	24511	*Larus novaehollandiae subsp. novaehollandiae (Silver Gull)*			
354.	25638	*Larus pacificus (Pacific Gull)*			
355.		*Lepidoperca occidentalis*			
356.		*Lepidotrigla modesta*			
357.		*Lepidotrigla spinosa*			
358.		*Leptoscarus vaigiensis*			
359.	25128	*Lerista christinae*			
360.	25133	*Lerista elegans*			
361.	25147	*Lerista lineata (Perth Slider, Lined Skink)*		P3	
362.	25148	*Lerista lineopunctulata*			
363.	25165	*Lerista praepedita*			
364.		*Lethrinus nebulosus*			
365.		*Leviprora inops*			
366.	25005	*Lialis burtonis*			
367.	25661	*Lichmera indistincta (Brown Honeyeater)*			
368.		*Limnichthys fasciatus*			
369.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
370.		*Lissocampus caudalis*			
371.		*Lissocampus fatiloquus*			
372.		*Lissocampus runa*			
373.		*Lissocampus sp.*			
374.		*Litarachna halei*			Y
375.	25388	*Litoria moorei (Motorbike Frog)*			
376.		*Lohmannella arenaria*			Y
377.		*Lotella rhacinus*			
378.		*Lycosa ariadnae*			
379.		*Lycosa australicola*			
380.	24690	*Macronectes giganteus (Southern Giant Petrel)*		IA	
381.		*Macroramphosus scolopax*			
382.	25654	*Malurus splendens (Splendid Fairy-wren)*			
383.		*Maroubra perserrata*			
384.		*Maxillicosta scabriceps*			
385.	24051	*Megaptera novaeangliae (Humpback Whale)*		S	
386.	25184	*Menetia greyii*			
387.	24598	*Merops ornatus (Rainbow Bee-eater)*			
388.		*Metavelifer multiradiatus*			
389.		*Meuschenia flavolineata*			
390.		*Meuschenia freycineti*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
391.		*Meuschenia galii*			
392.		*Meuschenia hippocrepis*			
393.		*Microcanthus strigatus*			
394.		*Microcarbo melanoleucos*			
395.		*Missulena occatoria*			
396.		*Monodactylus argenteus*			
397.	25191	*Morethia lineoocellata*			
398.	48008	*Morus serrator (Australasian Gannet)*			
399.		*Mugil cephalus*			
400.		*Muraenichthys australis*			
401.		*Muraenichthys sp.*			
402.		*Muraenichthys tasmaniensis subsp. smithi*			
403.	24223	*Mus musculus (House Mouse)*	Y		
404.		*Mustelus antarcticus*			
405.		*Myliobatis australis*			
406.		*Nannocampus subosseus*			
407.		*Neatypus obliquus*			
408.		*Nelusetta ayraudi*			
409.		*Nematalosa vlaminghi*			
410.		*Neoaploactis tridorsalis*			
411.	24738	*Neophema elegans (Elegant Parrot)*			
412.	24739	*Neophema petrophila (Rock Parrot)*			
413.	24210	*Neophoca cinerea (Australian Sea-lion)*		T	
414.		*Neoplatycephalus conatus*			
415.		*Neosebastes nigropunctatus*			
416.		*Neosebastes pandus*			
417.		*Neosebastes sp.*			Y
418.		*Nephila edulis*			
419.		*Nesogobius sp.*			
420.		*Norfolkia brachylepis*			
421.		*Norfolkia sp.*			
422.		*Notolabrus parilus*			
423.		*Notolabrus tetricus*			
424.	25742	*Numenius phaeopus (Whimbrel)*		IA	
425.		*Nunciella aspera*			
426.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
427.		*Nymphopsis acinacispinatus subsp. bathursti*			
428.		*Odax acroptilus*			
429.		*Odax cyanomelas*			
430.		*Omegophora armilla*			
431.		*Omobranchus germaini*			
432.	41347	*Onychoprion anaethetus (Bridled Tern)*		IA	
433.		*Ophiclinus gracilis*			
434.		*Ophiclinus pectoralis*			
435.		*Ophthalmolepis lineolatus*			
436.		*Oplegnathus woodwardi*			
437.		*Optivus agrammus*			
438.		*Orectolobus hutchinsi*			
439.		*Orectolobus hutchinsi?*			Y
440.		*Orectolobus ornatus*			
441.		*Orectolobus parvimaculatus*			
442.		*Ornithonyssus bacoti*			
443.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
444.		*Oxyconger leptognathus*			
445.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
446.	24624	*Pachycephala rufiventris subsp. rufiventris (Rufous Whistler)*			
447.	24692	*Pachyptila belcheri (Slender-billed Prion)*			
448.	24693	*Pachyptila desolata (Antarctic Prion)*			
449.		*Pagrus auratus*			
450.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
451.		*Parablennius intermedius*			
452.		*Parablennius postoculomaculatus*			
453.		*Parablennius sp.*			
454.		*Parapercis haackei*			
455.		*Parapercis ramsayi*			
456.		*Paraplagusia bilineata*			
457.		*Paraplesiops meleagris*			
458.		*Paraplotosus albilabris*			
459.		*Parapriacanthus elongatus*			
460.		*Parascyllium variolatum*			

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461.		*Paraulopus cf. nigripinnis*			Y
462.		*Parazanclistius hutchinsi*			
463.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
464.	25682	*Pardalotus striatus (Striated Pardalote)*			
465.		*Parequula elongata*			
466.		*Parequula melbournensis*			
467.		*Paristiopterus gallipavo*			
468.		*Parma bicolor*			
469.		*Parma mccullochi*			
470.		*Parma microlepis*			
471.		*Parma occidentalis*			
472.		*Parma sp.*			
473.		*Parma victoriae*			
474.		*Parupeneus heptacanthus*			
475.		*Parupeneus spilurus*			
476.	24674	*Pavo cristatus (Common Peafowl, Indian Peafowl)*	Y		
477.		*Pegasus lancifer*			
478.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
479.		*Pelsartia humeralis*			
480.		*Pempheris klunzingeri*			
481.		*Pempheris multiradiata*			
482.		*Perryena leucometopon*			
483.	48060	*Petrochelidon ariel (Fairy Martin)*			
484.	48061	*Petrochelidon nigricans (Tree Martin)*			
485.	24659	*Petroica goodenovii (Red-capped Robin)*			
486.		*Petroscirtes breviceps*			
487.		*Petroscirtes mitratus*			
488.		*Phacacarus flavellus*			Y
489.	24663	*Phaethon rubricauda (Red-tailed Tropicbird)*		P4	
490.	25697	*Phalacrocorax carbo (Great Cormorant)*			
491.	24665	*Phalacrocorax fuscescens (Black-faced Cormorant)*			
492.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
493.	25699	*Phalacrocorax varius (Pied Cormorant)*			
494.	24801	*Phalaropus lobatus (Red-necked Phalarope)*		IA	
495.	24409	*Phaps chalcoptera (Common Bronzewing)*			
496.	25587	*Phaps elegans (Brush Bronzewing)*			
497.	24675	*Phasianus colchicus (Common Pheasant, Domestic Pheasant)*	Y		
498.		*Phenacoscorpius sp.*			
499.	34039	*Phycodurus eques (Leafy Sea Dragon)*		P2	
500.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
501.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
502.		*Phyllophryne scortea*			
503.		*Phyllopteryx taeniolatus*			
504.		*Pictilabrus laticlavius*			
505.		*Pictilabrus sp.*			
506.		*Pictilabrus viridis*			
507.		*Pinkfloydia harveii*			
508.		*Plagiotremus rhinorhynchos*			
509.		*Plagiotremus tapeinosoma*			
510.		*Platax pinnatus*			Y
511.		*Platycephalus longispinis*			
512.		*Platycephalus orbitalis*			
513.		*Platycephalus sp.*			
514.		*Platycephalus speculator*			
515.		*Plectorhinchus flavomaculatus*			
516.		*Plectorhinchus unicolor*			
517.		*Plectranthias sp.*			
518.		*Plotosus lineatus*			
519.	24382	*Pluvialis fulva (Pacific Golden Plover)*		IA	
520.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
521.		*Podykipus collinus*			
522.		*Podykipus leptoiuloides*			
523.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
524.		*Polyspina piosae*			
525.		*Pomacentrus milleri*			
526.		*Pomacentrus sp.*			
527.		*Porocephalichthys dasyrhychus*			Y
528.		*Porocephalichthys dasyrhynchus*			
529.	24771	*Porzana tabuensis (Spotless Crake)*			
530.		*Posidonichthys hutchinsi*			

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531.		*Pseudocaranx dentex*			
532.		*Pseudocaranx georgianus*			
533.		*Pseudocaranx sp.*			
534.		*Pseudocaranx wrighti*			
535.		*Pseudolabrus biserialis*			
536.		*Pseudolabrus sp.*			
537.	25258	*Pseudonaja affinis subsp. exilis (Rottnest Island Dugite)*		P4	
538.		*Pseudophycis breviuscula*			
539.		*Pterois antennata*			
540.		*Pterygotrigla polyommata*			
541.	24711	*Puffinus assimilis subsp. assimilis (Little Shearwater)*			
542.	24715	*Puffinus huttoni (Hutton's Shearwater)*		T	
543.	24716	*Puffinus pacificus (Wedge-tailed Shearwater)*		IA	
544.		*Pugnaso curtirostris*			
545.		*Pycnothea flynni*			
546.		*Rachycentron canadum*			
547.	24245	*Rattus rattus (Black Rat)*	Y		
548.		*Raveniella arenacea*			
549.		*Raveniella peckorum*			
550.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
551.		*Regalecus glesne*			
552.		*Rhabdosargus sarba*			
553.	48096	*Rhipidura albiscapa (Grey Fantail)*			
554.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
555.		*Rhombognathus biscutatus*			Y
556.		*Rhombognathus foveolatus*			Y
557.		*Rhombognathus lepidus*			
558.		*Rhombognathus marginalis*			
559.		*Rhombognathus placidus*			Y
560.		*Rhombognathus psammophilus*			Y
561.		*Rhombognathus scutulatus*			
562.		*Rhombognathus thalassinus*			Y
563.		*Sarda orientalis*			
564.		*Sardinops neopilchardus*			
565.		*Saurida grandisquamis*			
566.		*Saurida tumbil*			
567.		*Scaptognathides australis*			Y
568.		*Scaptognathus australis*			Y
569.		*Scaptognathus peregrinus*			Y
570.		*Scarus ghobban*			
571.		*Scarus rivulatus*			
572.		*Scarus sp.*			
573.		*Schuettea woodwardi*			
574.		*Scobinichthys granulatus*			
575.		*Scomber australasicus*			
576.		*Scomberesox saurus*			
577.		*Scomberomorus commerson*			
578.		*Scorpaena n. sp. A*			
579.		*Scorpaena n.sp. A*			
580.		*Scorpaena sp.*			
581.		*Scorpaena sumptuosa*			
582.		*Scorpaenodes steenei*			
583.		*Scorpis aequipinnis*			
584.		*Scorpis georgianus*			
585.		*Scorpis sp.*			Y
586.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
587.		*Seriola dumerili*			
588.		*Seriola hippos*			
589.		*Seriola lalandi*			
590.		*Seriola sp.*			Y
591.	24145	*Setonix brachyurus (Quokka)*		T	
592.		*Siganus fuscescens*			
593.		*Sillago bassensis*			
594.		*Sillago robusta*			
595.		*Sillago vittata*			
596.		*Sillago vittata?*			
597.		*Simognathus delicatulus*			Y
598.		*Simognathus gibberosus*			Y
599.		*Simognathus gracilis*			Y
600.		*Simognathus maculatus*			Y

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601.		*Simognathus scutatus*			Y
602.		*Simognathus uniscutatus*			
603.		*Simognathus variolosus*			Y
604.		*Siphamia cephalotes*			
605.		*Siphonognathus argyrophanes*			
606.		*Siphonognathus beddomei*			
607.		*Siphonognathus caninus*			
608.		*Siphonognathus radiatus*			
609.	30948	*Smicrornis brevirostris (Weebill)*			
610.		*Solegnathus lettiensis*			
611.		*Sphyraena obtusata*			
612.		*Spratelloides robustus*			
613.		*Squalus megalops*			
614.		*Squatina australis*			
615.		*Stegastes obreptus*			
616.	48116	*Stercorarius antarcticus (Brown Skua)*		P4	
617.	24517	*Stercorarius parasiticus (Arctic jaeger, Arctic Skua)*		IA	
618.	24518	*Stercorarius pomarinus (Pomarine Jaeger, Pomarine Skua)*		IA	
619.	24522	*Sterna bergii (Crested Tern)*			
620.	25640	*Sterna dougallii (Roseate Tern)*		IA	
621.	48594	*Sternula nereis (Fairy Tern)*			
622.		*Stethojulis bandanensis*			
623.		*Stethojulis strigiventer*			
624.		*Sticharium dorsale*			
625.		*Stigmatopora argus*			
626.		*Stigmatopora sp.*			
627.	25589	*Streptopelia chinensis (Spotted Turtle-Dove)*	Y		
628.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
629.	25518	*Strophurus spinigerus*			
630.	24942	*Strophurus spinigerus subsp. spinigerus*			
631.		*Suezichthys bifurcatus*			
632.		*Suezichthys cyanolaemus*			
633.		*Sutorectus tentaculatus*			
634.		*Synchiropus papilio*			
635.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
636.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
637.		*Tetralycosa oraria*			
638.	34007	*Thalassarche chlororhynchos (Atlantic Yellow-nosed Albatross)*		T	
639.		*Thalasseleotris adela*			
640.	48597	*Thalasseus bergii (Crested Tern)*		IA	
641.		*Thalassoma lutescens*			
642.		*Thalassoma purpureum*			
643.		*Thalassoma septemfasciata*			
644.	48135	*Thinornis rubricollis (Hooded Plover, Hooded Dotterel)*		P4	
645.		*Threpterius maculosus*			
646.		*Thunnus maccoyii*			
647.		*Thysanophrys cirronasus*			
648.	25205	*Tiliqua rugosa subsp. konowi (Rottnest Island Bobtail)*		T	
649.		*Tilodon sexfasciatum*			
650.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
651.	24309	*Todiramphus sanctus subsp. sanctus (Sacred Kingfisher)*			
652.		*Torquigener pallimaculatus*			
653.		*Torquigener paxtoni*			
654.		*Torquigener pleurogramma*			
655.		*Torquigener sp.*			
656.		*Torquigener vicinus*			
657.		*Trachichthys australis*			
658.		*Trachinocephalus myops*			
659.		*Trachinops brauni*			
660.		*Trachinops noarlungae*			
661.		*Trachurus novaezelandiae*			
662.		*Trachurus sp.*			
663.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
664.	24803	*Tringa brevipes (Grey-tailed Tattler)*		P4	
665.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
666.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
667.	24809	*Tringa stagnatilis (Marsh Sandpiper, little greenshank)*		IA	
668.		*Trinorfolkia clarkei*			
669.		*Trinorfolkia incisa*			
670.		*Tripterygiid sp.*			

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671.		*Trygonoptera mucosa*			
672.		*Trygonoptera ovalis*			
673.		*Trygonoptera personata*			
674.		*Trygonorrhina fasciata*			
675.	48147	*Turnix varius (Painted Button-quail)*			
676.	30954	*Tursiops aduncus (Indo-Pacific Bottlenose Dolphin)*			
677.	24069	*Tursiops truncatus (Bottlenose Dolphin)*			
678.		*Upeneichthys lineatus*			
679.		*Upeneichthys stotti*			
680.		*Urolophus circularis*			
681.		*Urolophus lobatus*			
682.		*Urolophus paucimaculatus*			
683.		*Urolophus sp.*			
684.		*Urolophus viridis?*			Y
685.	25577	*Vanellus miles (Masked Lapwing)*			
686.	24386	*Vanellus tricolor (Banded Lapwing)*			
687.		*Velifer sp.*			
688.		*Venator immansueta*			
689.		*Venatrix pullastra*			
690.		*Vincentia badia*			
691.		*Vincentia punctata*			
692.		*Werthella ampliata*			Y
693.	41351	*Xenus cinereus (Terek Sandpiper)*		IA	
694.		*Zanclistius elevatus*			
695.		*Zebrias cancellatus*			
696.		*Zephyrichthys barryi*			
697.		*Zeus faber*			
698.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
Bacteria					
699.	27338	*Trichodesmium erythraeum*			
Chromista					
700.	26487	*Asperococcus bullosus*			
701.	35220	*Canistrocarpus cervicornis*			
702.	26586	*Caulocystis uvifera*			
703.	35912	*Cladosiphon vermicularis*			
704.	26662	*Cladostephus spongiosus*			
705.	26693	*Colpomenia peregrina*			
706.	26694	*Colpomenia sinuosa*			
707.	26713	*Cutleria kraftii*			
708.	26717	*Cystophora brownii*			
709.	26720	*Cystophora grevillei*			
710.	26764	*Dictyopteris australis*			
711.	26766	*Dictyopteris muelleri*			
712.	26767	*Dictyopteris plagiogramma*			
713.	29951	*Dictyopteris secundispiralis*			
714.	26775	*Dictyota ciliolata*			
715.	26776	*Dictyota dichotoma*			
716.	26778	*Dictyota furcellata*			
717.	26780	*Dictyota naevosa*			
718.	35218	*Dictyota nigricans*			
719.	35216	*Dictyota paniculata*			
720.	35223	*Dictyota polyclada*			
721.	29536	*Dictyota robusta*			
722.	26791	*Distromium flabellatum*			
723.	26805	*Ecklonia radiata*			
724.	48247	*Elachista nigra*	Y		
725.	48244	*Feldmannia mitchelliae*			
726.	48968	*Giraudya robusta*			Y
727.	26946	*Hormophysa cuneiformis*			
728.	26949	*Hydroclathrus clathratus*			
729.	27043	*Lobophora variegata*			
730.	27044	*Lobospira bicuspidata*			
731.	27090	*Myriodesma quercifolium*			
732.	27091	*Myriodesma serrulatum*			
733.	27115	*Padina boryana*			
734.	27116	*Padina elegans*			
735.		*Padina fraseri*			
736.	27117	*Padina gymnospora*			
737.	27118	*Padina sanctae-crucis*			

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738.	48303	*Petalonia binghamiae*	Y		
739.	27126	*Petalonia fascia*			
740.	27151	*Platythalia angustifolia*			
741.	27152	*Platythalia quercifolia*			
742.	27163	*Polycerea nigrescens*			
743.	27164	*Polycerea zostericola*			
744.	44573	*Sargassopsis decurrens*			
745.	42641	*Sargassum aquifolium*			
746.	42781	*Sargassum carpophyllum*			
747.	27238	*Sargassum distichum*			
748.	27239	*Sargassum fallax*			
749.	27242	*Sargassum flavicans*			
750.	27245	*Sargassum ilicifolium*			
751.	27246	*Sargassum lacerifolium*			
752.	27248	*Sargassum ligulatum*			
753.	27249	*Sargassum linearifolium*			
754.	29956	*Sargassum paradoxum*			
755.	27253	*Sargassum peronii*			
756.	27254	*Sargassum podacanthum*			
757.	27255	*Sargassum polycystum*			
758.	27260	*Sargassum tristichum*			
759.	27264	*Scaberia agardhii*			
760.	27271	*Scoresbyella profunda*			
761.	27273	*Scytothalia dorycarpa*			
762.	42785	*Sirophysalis trinodis*			
763.	27292	*Sphacelaria novae-hollandiae*			Y
764.	27293	*Sphacelaria rigidula*			
765.	27294	*Sphacelaria tribuloides*			
766.	27305	*Sporochnus radiciformis*			
767.	27306	*Sporochnus scoparius*			
768.	27320	*Stypopodium australasicum*			
769.	27345	*Turbinaria gracilis*			
770.	35897	*Zonaria diesingiana*			
771.	27372	*Zonaria spiralis*			
772.	27373	*Zonaria turneriana*			
Fungi					
773.		*Agaricus sp.*			
774.	27587	*Aspicilia calcarea*			
775.	27632	*Caloplaca holocarpa*			
776.	41653	*Caloplaca kaernefeltii*			
777.	27705	*Collema implicatum*			
778.	27726	*Diplotomma alboatrum*			
779.	27748	*Flavoparmelia rutidota*			
780.	27753	*Fulgensia bracteata*			
781.	27754	*Fulgensia subbracteata*			
782.		*Gymnopilus allantopus*			
783.	45301	*Jackelixia ligulata*			
784.	27922	*Parmotrema chinense*			
785.		*Peziza sp.*			
786.		*Phellinus badius*			Y
787.		*Physcia sp.*			
788.		*Reddellomyces parvulosporus*			
789.	28194	*Xanthoria parietina*			
Plantae					
790.	3282	*Acacia cyclops (Coastal Wattle)*			
791.	3424	*Acacia littorea*			
792.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
793.	3584	*Acacia truncata*			
794.	1208	*Acanthocarpus preissii*			
795.	26440	*Acanthophora dendroides*			
796.	48409	*Acetabularia caliculus*			
797.	26447	*Acrothamnion preissii*			
798.	6295	*Acrotriche cordata (Coast Ground Berry)*			
799.	1505	*Agave americana (Century Plant)*	Y		
800.	47094	*Agave attenuata*	Y		
801.	18379	*Agave sisalana*	Y		Y
802.	17202	*Agonis flexuosa var. flexuosa*			
803.	185	*Aira cupaniana (Silvery Hairgrass)*	Y		
804.	1374	*Allium ampeloprasum*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
805.	48620	*Althenia preissii*			
806.	6565	*Alyxia buxifolia (Dysentery Bush)*			
807.	26454	*Amansia serrata*			
808.	126	*Amphibolis antarctica (Sea Nymph)*			
809.	127	*Amphibolis griffithii*			
810.	26456	*Amphiplexia hymenocladioides*			
811.	26458	*Amphiroa anceps*			
812.	26463	*Amphiroa gracilis*			
813.	7833	*Angianthus preissianus*			
814.	26465	*Anisoschizus propaguli*			Y
815.	27374	*Anotrichium tenue var. thyrsigerum*			Y
816.	26475	*Antithamnion hanovioides*			
817.	6210	*Apium annuum*			
818.	26481	*Apjohnia laetevirens*			
819.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
820.	7839	*Arctotheca populifolia (Dune Arctotheca, Beach Pumpkin, Coast Capeweed, Beach Daisy)*	Y		
821.	19883	*Arenaria leptoclados*	Y		
822.	26484	*Areschougia ligulata*			
823.	7841	*Argyranthemum frutescens (Marguerite)*	Y		
824.	26486	*Asparagopsis taxiformis*			
825.	1364	*Asphodelus fistulosus (Onion Weed)*	Y		
826.	2452	*Atriplex cinerea (Grey Saltbush)*			
827.	2463	*Atriplex isatidea (Coast Saltbush)*			
828.	48417	*Austrokallymenia roensis*			Y
829.	17237	*Austrostipa elegantissima*			
830.	17240	*Austrostipa flavescens*			
831.		*Austrostipa sp.*			
832.	231	*Avellinia michelii*	Y		
833.	233	*Avena barbata (Bearded Oat)*	Y		
834.	26497	*Avrainvillea clavatiramea*			
835.	26500	*Balliella hirsuta*			Y
836.	743	*Baumea juncea (Bare Twigrush)*			
837.	48503	*Betaphycus speciosus*			
838.	4601	*Beyeria viscosa (Pinkwood)*			
839.	26511	*Bornetia binderiana*			
840.	4403	*Boronia alata (Winged Boronia)*			
841.	26516	*Botryocladia leptopoda*			
842.	26518	*Botryocladia sonderi*			
843.	8661	*Brachypodium distachyon (False Brome)*	Y		
844.	245	*Briza minor (Shivery Grass)*	Y		
845.	247	*Bromus arenarius (Sand Brome)*			
846.	249	*Bromus diandrus (Great Brome)*	Y		
847.	250	*Bromus hordeaceus (Soft Brome)*	Y		
848.	252	*Bromus madritensis (Madrid Brome)*	Y		
849.	253	*Bromus rubens (Red Brome)*	Y		
850.	26521	*Bryopsis australis*			
851.		*Bryopsis gemellipara*			
852.	26523	*Bryopsis macraildii*			
853.	26525	*Bryopsis plumosa*			
854.	3002	*Cakile maritima (Sea Rocket)*	Y		
855.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
856.	2845	*Calandrinia brevipedata (Short-stalked Purslane)*			
857.	40827	*Calandrinia tholiformis*			
858.	26528	*Callipsygma wilsonis*			Y
859.	4717	*Callitriche stagnalis (Common Starwort)*	Y		
860.	96	*Callitris preissii (Rottnest Island Pine, Maro)*			
861.	26533	*Callophycus costatus*			
862.	26534	*Callophycus dorsifer*			
863.	26535	*Callophycus harveyanus*			
864.	26536	*Callophycus oppositifolius*			
865.	3005	*Cardamine hirsuta (Common Bittercress)*	Y		
866.	7909	*Carduus pycnocephalus (Slender Thistle)*	Y		
867.	43241	*Carex thecata*			
868.	2798	*Carpobrotus virescens (Coastal Pigface, Kolboko, Bain)*			
869.	26546	*Carpopeltis elata*			
870.	26547	*Carpopeltis phyllophora*			
871.	26548	*Carpopeltis spongeaplexus*			
872.	19842	*Casuarina equisetifolia*	Y		
873.	18321	*Casuarina glauca*	Y		

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874.	1742	*Casuarina obesa (Swamp Sheoak, Kuli)*			
875.	13685	*Catapodium rigidum (Rigid Fescue)*	Y		
876.	26553	*Caulerpa articulata*			
877.	26556	*Caulerpa cactoides*			
878.	26559	*Caulerpa cupressoides*			
879.	47053	*Caulerpa cupressoides var. cupressoides*			
880.	44539	*Caulerpa cylindracea*			
881.	26561	*Caulerpa ellistoniae*			
882.	26562	*Caulerpa fergusonii*			
883.	26563	*Caulerpa flexilis*			
884.	27380	*Caulerpa flexilis var. muelleri*			
885.	48455	*Caulerpa geminata*			
886.	26564	*Caulerpa hedleyi*			
887.	26565	*Caulerpa heterophylla*			
888.	26568	*Caulerpa lentillifera*			
889.	26569	*Caulerpa longifolia*			
890.	27382	*Caulerpa longifolia forma crispata*			
891.	26570	*Caulerpa obscura*			
892.	26571	*Caulerpa papillosa*			
893.	37643	*Caulerpa parvifolia*			
894.	26574	*Caulerpa scalpelliformis*			
895.	26575	*Caulerpa sedoides*			
896.	26578	*Caulerpa simpliciuscula*			
897.	46993	*Caulerpa taxifolia var. distichophylla*			
898.	41564	*Cenchrus clandestinus (Kikuyu Grass)*	Y		
899.	7916	*Centaurea melitensis (Maltese Cockspur, Malta Thistle)*	Y		
900.	6539	*Centaurium erythraea (Common Centaury)*	Y		
901.	17800	*Centaurium pulchellum*	Y		
902.	6542	*Centaurium tenuiflorum*	Y		
903.	26587	*Centroceras clavulatum*			
904.	1134	*Centrolepis polygyna (Wiry Centrolepis)*			
905.	26593	*Ceramium filicula*			
906.	26599	*Ceramium puberulum*			
907.	26600	*Ceramium pusillum*			
908.	13119	*Cerastium balearicum*	Y		
909.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
910.	26607	*Chaetomorpha aerea*			
911.	26614	*Chamaebotrys boergesenii*			Y
912.	26616	*Champia affinis*			
913.	26617	*Champia compressa*			
914.	26619	*Champia stipitata*			
915.	26622	*Chauviniella coriifolia*			
916.	2494	*Chenopodium murale (Nettle-leaf Goosefoot)*	Y		
917.	26626	*Chlorodesmis baculifera*			Y
918.	7937	*Cirsium vulgare (Spear Thistle, Scotch Thistle)*	Y		
919.	26649	*Cladophora albida*			
920.	48391	*Cladophora dalmatica*			
921.	26653	*Cladophora laetevirens*			
922.	26654	*Cladophora lehmanniana*			
923.	26656	*Cladophora prolifera*			
924.	48667	*Cladophora rhizoclonioidea*			
925.	48668	*Cladophora subsimplex*			
926.	26659	*Cladophora valonioides*			
927.	26665	*Claviclonium ovatum*			
928.	10804	*Clematis linearifolia*			
929.	26667	*Codiophyllum flabelliforme*			
930.	26671	*Codium duthieae*			
931.	26672	*Codium galeatum*			
932.	26675	*Codium laminarioides*			
933.	26676	*Codium lucasii*			
934.	26678	*Codium muelleri*			
935.	26679	*Codium perriniae*			
936.	26683	*Codium spongiosum*			
937.	26685	*Coelarthrum cliftonii*			
938.	26686	*Coelarthrum opuntia*			
939.	4552	*Comesperma confertum*			
940.	4555	*Comesperma integerrimum*			
941.	1427	*Conostylis candicans (Grey Cottonhead)*			
942.	12027	*Conostylis candicans subsp. calcicola*			
943.	7939	*Conyza bonariensis (Flaxleaf Fleabane)*	Y		

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944.	7941	*Conyza parva*	Y		
945.	20074	*Conyza sumatrensis*	Y		
946.	277	*Cortaderia selloana (Pampas Grass)*	Y		
947.	7943	*Cotula australis (Common Cotula)*			
948.	7944	*Cotula bipinnata (Ferny Cotula)*	Y		
949.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
950.	48979	*Crassa secundata*			
951.	3137	*Crassula colorata (Dense Stonecrop)*			
952.	11563	*Crassula colorata var. colorata*			
953.	3138	*Crassula decumbens (Rufous Stonecrop)*			
954.	11349	*Crassula decumbens var. decumbens*			
955.	3140	*Crassula glomerata*	Y		
956.	15706	*Crassula natans var. minus*	Y		
957.	11345	*Crassula thunbergiana subsp. thunbergiana*	Y		
958.	26708	*Cryptonemia kallymenioides*			
959.	26712	*Curdiea obesa*			
960.	7053	*Cymbalaria muralis (Ivyleaf Toadflax)*	Y		
961.	283	*Cynodon dactylon (Couch)*	Y		
962.	10916	*Cyrtostylis huegelii*			
963.	26738	*Dasya elongata*			
964.	26749	*Dasya villosa*			
965.	6218	*Daucus glochidiatus (Australian Carrot)*			
966.	26757	*Delisea pulchra*			
967.	6616	*Dichondra repens (Kidney Weed)*			
968.	29616	*Dichotomaria marginata*			
969.	29615	*Dichotomaria obtusata*			
970.	34959	*Dichotomaria spathulata*			
971.	26758	*Dicranema revolutum*			
972.	26762	*Dictyomenia sonderi*			
973.	26769	*Dictyosphaeria cavernosa*			
974.	26770	*Dictyosphaeria sericea*			
975.	26771	*Dictyosphaeria versluysii*			
976.	4454	*Diplolaena dampieri (Southern Diplolaena)*			
977.	3011	*Diplotaxis muralis (Wall Rocket)*	Y		
978.	7054	*Dischisma arenarium*	Y		
979.	26793	*Ditria expleta*			
980.	7961	*Dittrichia graveolens (Stinkwort)*	Y		
981.	4754	*Dodonaea aptera (Coast Hop-bush)*			
982.	26794	*Dotyophycus abbottiae*			
983.	26797	*Drewiana nitella*			
984.	3128	*Drosera ramellosa (Branched Sundew)*			
985.	346	*Ehrharta brevifolia (Annual Veldt Grass)*	Y		
986.	11485	*Ehrharta brevifolia var. cuspidata*	Y		
987.	349	*Ehrharta longiflora (Annual Veldt Grass)*	Y		
988.	12064	*Enchylaena tomentosa var. tomentosa (Barrier Saltbush)*			
989.	26811	*Endosiphonia spinulosa*			
990.	26818	*Epiphloea bullosa*			
991.	376	*Eragrostis curvula (African Lovegrass)*	Y		
992.	7215	*Eremophila glabra (Tar Bush)*			
993.	17175	*Eremophila glabra subsp. albicans*			
994.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
995.	26823	*Erythroclonium sonderi*			
996.	48860	*Erythrostemon gilliesii*	Y		
997.	26826	*Erythrymenia minuta*			
998.	5580	*Eucalyptus camaldulensis (River Gum, Yabalinyba)*			
999.	35345	*Eucalyptus camaldulensis subsp. obtusa (Blunt-budded River Red Gum)*			
1000.	5615	*Eucalyptus decipiens (Limestone Marlock, Moit)*			
1001.	5638	*Eucalyptus erythrocorys (Illyarrie)*			
1002.	5659	*Eucalyptus gomphocephala (Tuart, Duart)*			
1003.	5775	*Eucalyptus spathulata (Swamp Mallet)*			
1004.	18085	*Eucalyptus utilis*			
1005.	4636	*Euphorbia paralias (Sea Spurge)*	Y		
1006.	4638	*Euphorbia peplus (Petty Spurge)*	Y		
1007.	26829	*Euptilocladia spongiosa*			
1008.	26830	*Euptilota articulata*			
1009.	1515	*Ferraria crispa (Black Flag)*	Y		
1010.	11445	*Ferraria crispa subsp. crispa*	Y		
1011.	20216	*Ficinia nodosa (Knotted Club Rush)*			
1012.	1747	*Ficus carica (Common Fig)*	Y		
1013.		*Ficus elastica*			

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1014.		*Ficus macrophylla*			
1015.		*Ficus microcarpa subsp. hillii*			Y
1016.	47095	*Ficus rubiginosa*	Y		Y
1017.	5209	*Frankenia pauciflora (Seaheath)*			
1018.	907	*Gahnia trifida (Coast Saw-sedge)*			
1019.	26835	*Galaxaura rugosa*			
1020.	7323	*Galium murale (Small Goosegrass)*	Y		
1021.	20247	*Gamochaeta calviceps*	Y		
1022.	26837	*Ganonema farinosum*			
1023.	35913	*Gelidiopsis scoparia*			
1024.	26847	*Gelidium australe*			Y
1025.	26849	*Gelidium pusillum*			
1026.	26850	*Gelinaria ulvoidea*			
1027.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
1028.	26854	*Gigartina disticha*			
1029.	26858	*Glaphyrymenia pustulosa*			
1030.	26860	*Gloiocladia halymenioides*			
1031.	26864	*Gloiosaccion brownii*			
1032.	7983	*Gnaphalium indutum (Tiny Cudweed)*			
1033.	6587	*Gomphocarpus fruticosus (Narrowleaf Cottonbush)*	Y		
1034.	6161	*Gonocarpus pithyoides*			
1035.	26867	*Gracilaria blodgettii*			
1036.	26872	*Gracilaria preissiana*			
1037.	26873	*Gracilaria salicornia*			
1038.	36701	*Grateloupia subpectinata*			
1039.	26886	*Griffithsia teges*			
1040.	5011	*Guichenotia ledifolia*			
1041.	26887	*Guiryella repens*			
1042.	47213	*Halimeda versatilis*			
1043.	48568	*Halopeltis australis*			
1044.	164	*Halophila ovalis (Sea Wrack)*			
1045.	35863	*Haloplegma duperreyi*			
1046.	26900	*Haloplegma preissii*			
1047.	37640	*Halymenia floresii*			
1048.	48666	*Halymenia harveyana*			
1049.	26911	*Haraldiophyllum erosum*			
1050.	3016	*Heliophila pusilla*	Y		
1051.	6707	*Heliotropium curassavicum (Smooth Heliotrope)*			
1052.	26912	*Helminthocladia australis*			
1053.	26913	*Helminthora australis*			
1054.	2689	*Hemichroa pentandra (Trailing Jointweed)*			
1055.	26914	*Hemineura frondosa*			
1056.	26915	*Hennedya crispa*			
1057.	26922	*Herposiphonia versicolor*			
1058.	26927	*Heterodoxia denticulata*			
1059.	26929	*Heterosiphonia callithamnium*			
1060.	26930	*Heterosiphonia crassipes*			
1061.	26938	*Heterosiphonia wrangelioides*			
1062.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
1063.	26945	*Holotrichia comosa*			
1064.	449	*Hordeum leporinum (Barley Grass)*	Y		
1065.	18137	*Hornungia procumbens*	Y		
1066.	166	*Hydrilla verticillata (Water Thyme)*			
1067.	6224	*Hydrocotyle blepharocarpa*			
1068.	6229	*Hydrocotyle diantha*			
1069.	6232	*Hydrocotyle hispidula*			
1070.	6241	*Hydrocotyle tetragonocarpa*			
1071.	26961	*Hymenocladia conspersa*			
1072.	26966	*Hypnea charoides*			
1073.	35922	*Hypnea cornuta*			
1074.	35898	*Hypnea musciformis*			
1075.	26971	*Hypnea ramentacea*			
1076.	26973	*Hypnea valentiae*			
1077.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
1078.	26981	*Hypoglossum revolutum*			
1079.	1531	*Iris germanica (Flag Iris)*	Y		
1080.	20200	*Isolepis cernua var. setiformis*			
1081.	917	*Isolepis marginata (Coarse Club-rush)*			
1082.	26984	*Jania affinis*			
1083.	26985	*Jania micrarthrodia*			

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1084.	36141	*Jania pulchella*			
1085.	48292	*Jania rosea*			
1086.	26988	*Jania verrucosa*			
1087.	19632	*Johnsonia pubescens subsp. pubescens*			
1088.	1178	*Juncus bufonius (Toad Rush)*	Y		
1089.	11922	*Juncus kraussii subsp. australiensis*			
1090.	26991	*Kallymenia spinosa*			Y
1091.	26995	*Kuetzingia canaliculata*			
1092.	30331	*Lachnagrostis nesomytica*			Y
1093.	30332	*Lachnagrostis nesomytica subsp. nesomytica*		P1	Y
1094.	30333	*Lachnagrostis nesomytica subsp. pseudofiliformis*		P1	Y
1095.	14646	*Lagunaria patersonia*	Y		
1096.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
1097.	26998	*Laurencia brongniartii*			
1098.	48408	*Laurencia dendroidea*			
1099.	27000	*Laurencia elata*			
1100.	27001	*Laurencia filiformis*			
1101.	27002	*Laurencia forsteri*			
1102.	48419	*Leiomenia cribrosa*			
1103.	44490	*Leontodon rhagadioloides*	Y		
1104.	19989	*Lepidium didymum*	Y		
1105.	3027	*Lepidium foliosum (Leafy Peppercress)*			
1106.	3043	*Lepidium puberulum*		P4	
1107.	42742	*Lepidosperma calcicola*			
1108.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
1109.	940	*Lepidosperma pubisquameum*			
1110.	945	*Lepidosperma squamatum*			
1111.	1493	*Leucojum aestivum (Snowflake)*	Y		
1112.	16449	*Leucophyta brownii*			
1113.	6405	*Leucopogon insularis*			
1114.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
1115.	27018	*Leveillea jungermannioides*			
1116.	27020	*Liagora australasica*			
1117.	27024	*Liagora izziae*			Y
1118.	27030	*Liagora wilsoniana*			
1119.	9289	*Lobelia anceps (Angled Lobelia)*			
1120.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
1121.	6968	*Lycium ferocissimum (African Boxthorn)*	Y		
1122.	2396	*Lysiana casuarinae*			
1123.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
1124.	36480	*Malva arborea (Tree Mallow)*	Y		
1125.	4961	*Malva parviflora (Marshmallow)*	Y		
1126.	31351	*Malva preissiana*			
1127.	27055	*Martensia australis*			
1128.	48414	*Martensia denticulata*			
1129.	4079	*Medicago polymorpha (Burr Medic)*	Y		
1130.	4080	*Medicago sativa (Alfalfa)*	Y		
1131.	19721	*Melaleuca armillaris*	Y		
1132.	5920	*Melaleuca huegelii (Chenille Honeymyrtle)*			
1133.	5922	*Melaleuca lanceolata (Rottnest Teatree, Moonah)*			
1134.	5943	*Melaleuca nesophila (Mindiyed)*			
1135.	4516	*Melia azedarach (White Cedar)*			
1136.	4785	*Melianthus major*	Y		
1137.	4085	*Melilotus indicus*	Y		
1138.	27062	*Meristotheca papulosa*			
1139.	2813	*Mesembryanthemum crystallinum (Iceplant)*	Y		
1140.	27067	*Metagoniolithon chara*			
1141.	27068	*Metagoniolithon radiatum*			
1142.	27069	*Metagoniolithon stelliferum*			
1143.	27070	*Metamastophora flabellata*			
1144.	35123	*Microdictyon okamurae*			
1145.	27074	*Microdictyon umbilicatum*			
1146.	485	*Microlaena stipoides (Weeping Grass)*			
1147.	8105	*Millotia myosotidifolia*			
1148.	16693	*Minuartia mediterranea*	Y		
1149.	19179	*Moraea flaccida (One-leaf Cape Tulip)*	Y		
1150.	19180	*Moraea miniata (Two-leaf Cape Tulip)*	Y		
1151.	27079	*Mychodea carnosa*			
1152.	27083	*Mychodea pusilla*			
1153.	7289	*Myoporum caprarioides (Slender Myoporum)*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1154.	7291	*Myoporum insulare (Blueberry Tree, boobialla)*			
1155.	6722	*Myosotis australis (Southern Forget-me-not)*		P4	
1156.	11019	*Narcissus papyraceus*	Y		
1157.	1495	*Narcissus tazetta (Jonquil)*	Y		
1158.	44496	*Narcissus tazetta subsp. italicus*	Y		
1159.	27098	*Neogoniolithon brassica-florida*			
1160.	44525	*Neoizziella divaricata*			
1161.	18356	*Nerium oleander*	Y		
1162.	27100	*Neurymenia fraxinifolia*			
1163.	6974	*Nicotiana glauca (Tree Tobacco)*	Y		
1164.	4366	*Nitraria billardierei (Nitre Bush)*			
1165.	27103	*Nizymenia conferta*			
1166.	27104	*Nizymenia furcata*			
1167.	6503	*Olea europaea (Olive)*	Y		
1168.	8127	*Olearia axillaris (Coastal Daisybush)*			
1169.	1372	*Ornithogalum arabicum (Lesser Cape Lily)*	Y		
1170.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
1171.	4349	*Oxalis corniculata (Yellow Wood Sorrel)*	Y		
1172.	30375	*Oxalis exilis*			
1173.	4356	*Oxalis pes-caprae (Soursob)*	Y		
1174.	516	*Parapholis incurva (Coast Barbgrass)*	Y		
1175.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
1176.	12670	*Parietaria cardiostegia*			
1177.	1762	*Parietaria debilis (Pellitory)*			
1178.	43763	*Pauridia glabella*			
1179.	27120	*Pedobesia clavaeformis*			
1180.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
1181.	4346	*Pelargonium littorale*			
1182.	27128	*Peyssonnelia inamoena*			
1183.	27129	*Peyssonnelia novae-hollandiae*			
1184.	27133	*Phacelocarpus labillardieri*			
1185.	44540	*Phoenix canariensis (Canary Islands Date Palm)*	Y		
1186.	1042	*Phoenix dactylifera (Date Palm)*	Y		
1187.	43506	*Phormium tenax*	Y		
1188.	16825	*Phyllangium divergens*			
1189.	4675	*Phyllanthus calycinus (False Boronia)*			
1190.	27141	*Phyllodictyon anastomosans*			
1191.	17671	*Pinus halepensis*	Y		
1192.	88	*Pinus radiata (Radiata Pine)*	Y		
1193.	19745	*Pittosporum ligustrifolium*			
1194.	7299	*Plantago debilis*			
1195.	7303	*Plantago lanceolata (Ribwort Plantain)*	Y		
1196.	27144	*Platoma cyclocolpum*			
1197.	36360	*Platyclinia ramosa*			Y
1198.	27146	*Platysiphonia hypneoides*			
1199.	27154	*Plocamium angustum*			
1200.	27155	*Plocamium cartilagineum*			
1201.	27156	*Plocamium mertensii*			
1202.	27157	*Plocamium preissianum*			
1203.	571	*Poa annua (Winter Grass)*	Y		
1204.	577	*Poa poiformis (Coastal Poa)*			
1205.	8182	*Podotheca angustifolia (Sticky Longheads)*			
1206.	27162	*Pollexfenia pedicellata*			
1207.	2905	*Polycarpon tetraphyllum (Fourleaf Allseed)*	Y		
1208.	581	*Polypogon maritimus (Coast Beardgrass)*	Y		
1209.	35157	*Polypogon maritimus var. subspatheaceus*	Y		
1210.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
1211.	583	*Polypogon tenellus*			
1212.	27170	*Polysiphonia australiensis*			
1213.	29621	*Polysiphonia forfex*			
1214.	27179	*Polysiphonia sertularioides*			
1215.	4688	*Poranthera drummondii*			
1216.	2884	*Portulaca oleracea (Purslane, Wakati)*			
1217.	123	*Posidonia australis (Fibreball Weed)*			
1218.	105	*Posidonia coriacea*			
1219.	1674	*Prasophyllum giganteum (Bronze Leek Orchid)*			
1220.	27190	*Protokuetzingia australasica*			
1221.	27191	*Pseudobryopsis hainanensis*			
1222.	36219	*Pseudocrossidium hornschuchianum*			
1223.	27194	*Psilothallia striata*			

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1224.	27195	*Pterocladia lucida*			
1225.	27206	*Ptilophora prolifera*			
1226.	2935	*Ranunculus pumilio (Smallflower Buttercup)*			
1227.	11831	*Ranunculus pumilio var. politus*			
1228.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
1229.	3083	*Reseda alba (White Mingnonette)*	Y		
1230.	3085	*Reseda luteola (Wild Mingnonette)*	Y		
1231.	27210	*Rhabdonia clavigera*			
1232.	2578	*Rhagodia baccata (Berry Saltbush)*			
1233.	11341	*Rhagodia baccata subsp. baccata*			
1234.	11930	*Rhagodia baccata subsp. dioica (Sea Berry Saltbush)*			
1235.	4822	*Rhamnus alaternus (Buckthorn)*	Y		
1236.	27214	*Rhipiliopsis multiplex*			Y
1237.	27215	*Rhipiliopsis peltata*			
1238.	27220	*Rhodopeltis australis*			
1239.	27221	*Rhodopeltis borealis*			
1240.	4705	*Ricinus communis (Castor Oil Plant)*	Y		
1241.	48887	*Roepera billardierei*			
1242.	48901	*Roepera similis*			
1243.	11544	*Romulea rosea var. australis (Guildford Grass)*	Y		
1244.	10970	*Rostraria cristata*	Y		
1245.	116	*Ruppia polycarpa*			
1246.	117	*Ruppia tuberosa*			
1247.	40426	*Rytidosperma occidentale*			
1248.	2906	*Sagina apetala (Annual Pearlwort)*	Y		
1249.	2908	*Sagina maritima*	Y		
1250.	48433	*Salicornia blackiana*			
1251.	48430	*Salicornia quinqueflora*			
1252.	6484	*Samolus repens (Creeping Brookweed)*			
1253.	27229	*Sarcomenia delesserioides*			
1254.	27230	*Sarconema filiforme*			
1255.	7606	*Scaevola crassifolia (Thick-leaved Fan-flower)*			
1256.	41660	*Schenkia australis*			
1257.	994	*Schoenus humilis*			
1258.	1004	*Schoenus nitens (Shiny Bog-rush)*			
1259.	27269	*Scinaia aborealis*			
1260.	27270	*Scinaia tsinglanensis*			
1261.	27274	*Sebdenia flabellata*			
1262.	27277	*Semnocarpa minuta*			
1263.	25884	*Senecio pinnatifolius var. latilobus*			
1264.	25882	*Senecio pinnatifolius var. maritimus (Coastal Groundsel)*			
1265.	2910	*Silene nocturna (Mediterranean Catchfly)*	Y		
1266.	27280	*Siphonocladus tropicus*			
1267.	3072	*Sisymbrium orientale (Indian Hedge Mustard)*	Y		
1268.	47173	*Solanum lycopersicum (Tomato)*	Y		
1269.	7022	*Solanum nigrum (Black Berry Nightshade)*	Y		
1270.	7037	*Solanum symonii*			
1271.	27281	*Solieria robusta*			
1272.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
1273.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
1274.	44731	*Sonderophycus capensis*			
1275.	616	*Sorghum bicolor (Grain Sorghum)*	Y		
1276.	27286	*Spermothamnion miniatum*			Y
1277.	624	*Spinifex hirsutus (Hairy Spinifex)*			
1278.	625	*Spinifex longifolius (Beach Spinifex)*			
1279.	635	*Sporobolus virginicus (Marine Couch)*			
1280.	27309	*Spyridia dasyoides*			
1281.	27310	*Spyridia filamentosa*			
1282.	4828	*Spyridium globulosum (Basket Bush)*			
1283.	9070	*Stackhousia pubescens (Downy Stackhousia)*			
1284.	48423	*Stauromenia lacerata*			
1285.	2918	*Stellaria media (Chickweed)*	Y		
1286.	20397	*Stellaria pallida*	Y		
1287.	636	*Stenotaphrum secundatum (Buffalo Grass)*	Y		
1288.	27318	*Struvea plumosa*			
1289.	30278	*Stylidium androsaceum*			
1290.	2639	*Suaeda australis (Seablite)*			
1291.	32438	*Syntrichia pagorum*			
1292.	132	*Syringodium isoetifolium*			
1293.	15741	*Tamarix aphylla (Athel Tree)*	Y		

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
1294.	27326	*Tanakaella itonoi*			
1295.	17923	*Tecoma stans*	Y		
1296.	33236	*Tecticornia halocnemoides (Shrubby Samphire)*			
1297.	33319	*Tecticornia indica subsp. bidens*			
1298.	4256	*Templetonia retusa (Cockies Tongues)*			
1299.	2820	*Tetragonia decumbens (Sea Spinach)*	Y		
1300.	2823	*Tetragonia implexicoma (Bower Spinach)*			
1301.	134	*Thalassodendron pachyrhizum*			
1302.	5077	*Thomasia cognata*			
1303.	2644	*Threlkeldia diffusa (Coast Bonefruit)*			
1304.	1343	*Thysanotus patersonii*			
1305.	29601	*Titanophycus validus*			
1306.	27335	*Tolypiocladia calodictyon*			
1307.	27336	*Tolypiocladia glomerulata*			
1308.	1368	*Trachyandra divaricata*	Y		
1309.	6266	*Trachymene coerulea (Blue Lace Flower)*			
1310.	19041	*Trachymene coerulea subsp. coerulea*			
1311.	27340	*Tricleocarpa cylindrica*			
1312.	4314	*Trifolium suffocatum (Suffocated Clover)*	Y		
1313.	4315	*Trifolium tomentosum (Woolly Clover)*	Y		
1314.	15509	*Trifolium tomentosum var. tomentosum*	Y		
1315.	146	*Triglochin minutissima*			
1316.	147	*Triglochin mucronata*			
1317.	151	*Triglochin striata*			
1318.	152	*Triglochin trichophora*			
1319.	27347	*Tylotus obtusatus*			
1320.	99	*Typha orientalis (Bulrush, Cumbungi)*			
1321.	35260	*Ulva compressa*			
1322.	27352	*Ulva lactuca*			
1323.	27354	*Ulva rigida*			
1324.	1767	*Urtica urens (Small Nettle)*	Y		
1325.	27356	*Valonia macrophysa*			
1326.	27360	*Vidalia spiralis*			
1327.	11137	*Vulpia fasciculata*	Y		
1328.	11018	*Vulpia muralis*	Y		
1329.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
1330.	12052	*Vulpia myuros forma megalura*	Y		
1331.	13328	*Waitzia nitida*			
1332.	17910	*Washingtonia filifera*	Y		
1333.		*Washingtonia robusta*			Y
1334.	27361	*Webervanbossea kaliformis*			
1335.	32455	*Weissia controversa*			
1336.	6939	*Westringia dampieri*			
1337.	6659	*Wilsonia humilis (Silky Wilsonia)*			
1338.	27368	*Wrangelia plumosa*			
1339.	1398	*Wurmbea monantha*			
1340.	27370	*Yamadaella caenomyce*			
1341.	1049	*Zantedeschia aethiopica (Arum Lily)*	Y		

Protozoa

1342.	39058	*Perichaena depressa*			
1343.	39096	*Trichia contorta*			

Conservation Codes
T - Rare or likely to become extinct
X - Presumed extinct
IA - Protected under international agreement
S - Other specially protected fauna
1 - Priority 1
2 - Priority 2
3 - Priority 3
4 - Priority 4
5 - Priority 5

[1] For NatureMap's purposes, species flagged as endemic are those whose records are wholely contained within the search area. Note that only those records complying with the search criterion are included in the calculation. For example, if you limit records to those from a specific datasource, only records from that datasource are used to determine if a species is restricted to the query area.

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Our ref: AU213012164.001

Date: 11 December 2023

Bridie Howe-Keetelaar
Development Planning Coordinator
Rottnest Island Authority
PO Box 693 Fremantle WA 6959

Dear Bridie,

Ground-truthing: Qualitative assessment of vegetation in proposed Parker Point Road clearing area

This letter report discusses the qualitative assessment RPS undertook of the vegetation and its condition in the proposed clearing area on Parker Point road, Rottnest Island.

On Friday 15th September, RPS Lead Botanist Martin Henson visited Rottnest Island to conduct a qualitative assessment of the vegetation within the proposed clearing area (NVCP site) (Figure 1).

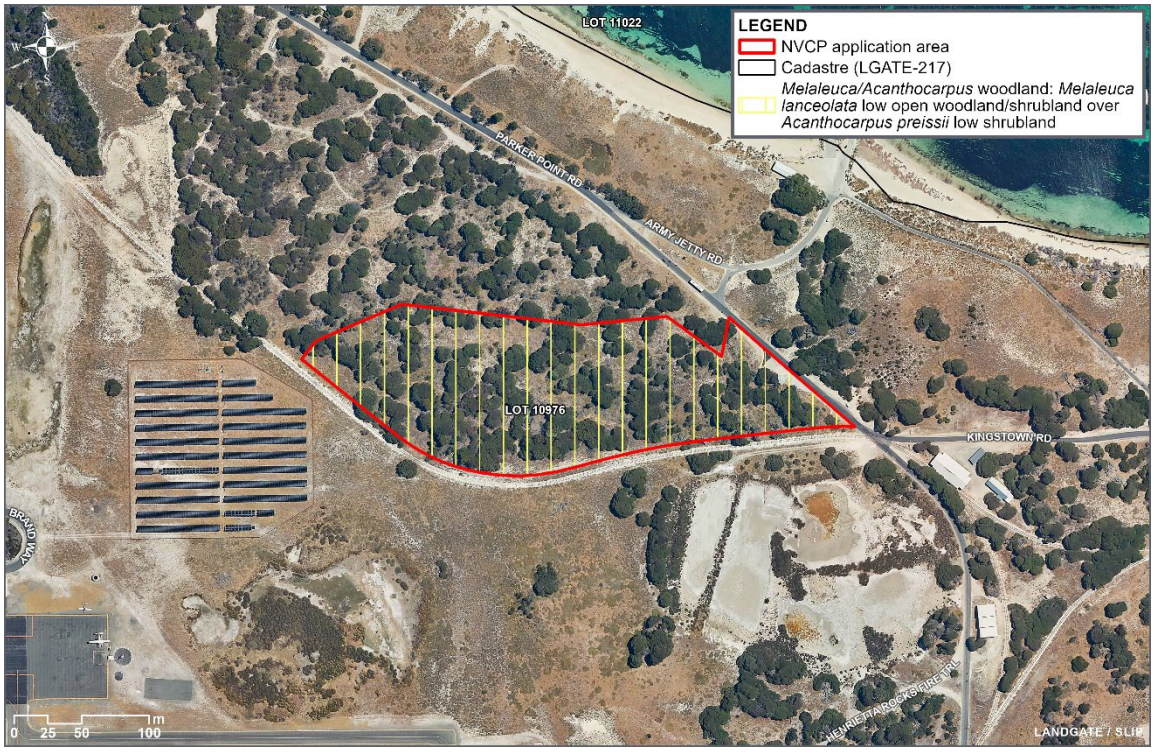

Figure 1 Proposed clearing area

Previous work (Focused Vision Consulting, 2022) mapped this area as:

- **MIAp**: *Melaleuca/Acanthocarpus* woodland: *Melaleuca lanceolata* Tall Shrubland over *Acanthocarpus preissii* Low Open Shrubland.

Vegetation Condition was mapped as:

- Very Good by the scale of Keighery (1994) (Focused Vision Consulting, 2022; 360 Environmental, 2022).

Examination of the mapping provided shows that the surveying botanists (Focused Vision Consulting) placed one quadrat (Q11) just north of the northern boundary of the site, and walked one traverse across the current site from north-west to south-east in the western portion of the site, and then along the southern boundary following the rail line back to Parker Point Road. The purpose of this assessment was to ground-truth the mapping presented in the previous reports. Focused Vision Mapping is included as Figures A and B at the end of this document.

The vegetation unit described in the extrapolated mapping of the NVCP site is analogous to the state listed Threatened Ecological Community (TEC) "*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described by Gibson *et. al.* 1994)". This TEC is listed as Critically Endangered (State of Western Australia, 2023).

Methods

The site was traversed in an east-west direction (Figure 2) and four relevé sites were described. Digital photos were taken at these and other points.

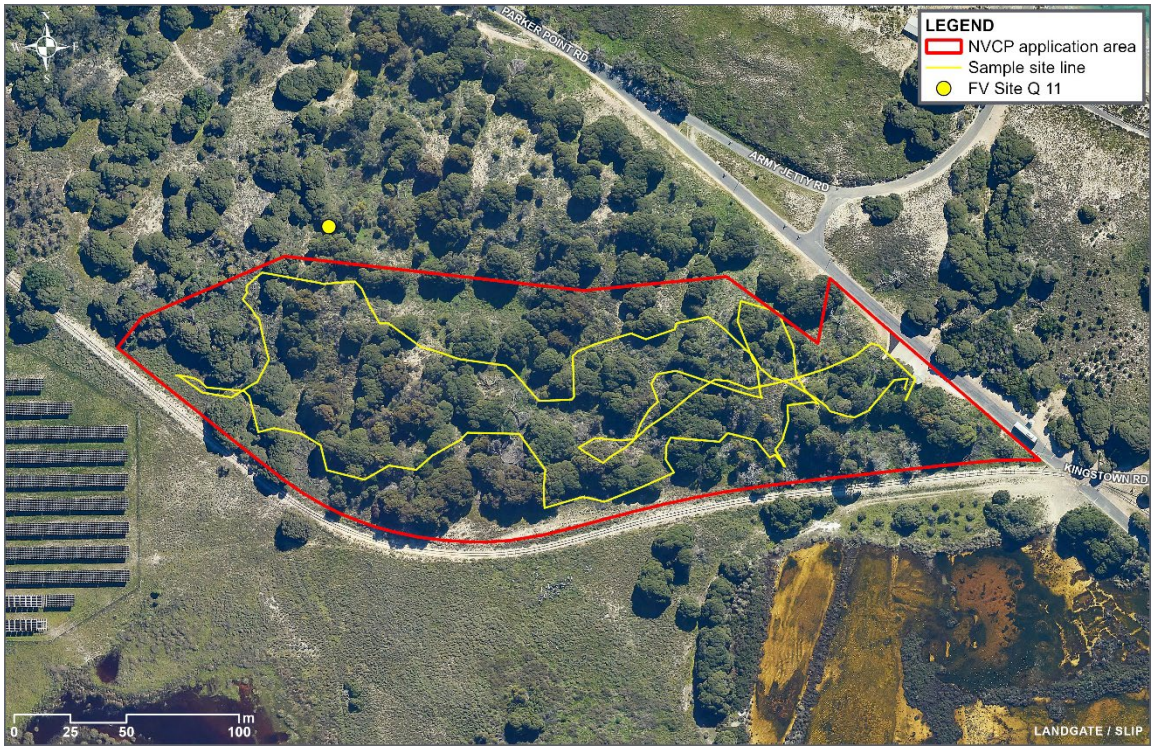

Figure 2 RPS survey tracks, including Focused Vision quadrat 11 site

Results and Discussion

RPS considers the extrapolated vegetation type mapping of the NVCP site is generally correct. The vegetation type *Melaleuca/Acanthocarpus* woodland as described by Focused Vision Consulting (2022) is dominant, although RPS would modify the description provided by Focused Vision Consulting (2022) to:

- **MIAp**: *Melaleuca/Acanthocarpus* woodland: *Melaleuca lanceolata* (*Callitris preissii*) low open woodland/shrubland over *Acanthocarpus preissii* low shrubland (Figure 3).

Plate 1 shows the vegetation type across the proposed clearing area.

A few examples of the Rottnest Island Pine, *Callitris preissii* were noted. The introduced eucalypt *Eucalyptus utilis* (Coastal Moort) was noted as present and appears well established (Plate 2).

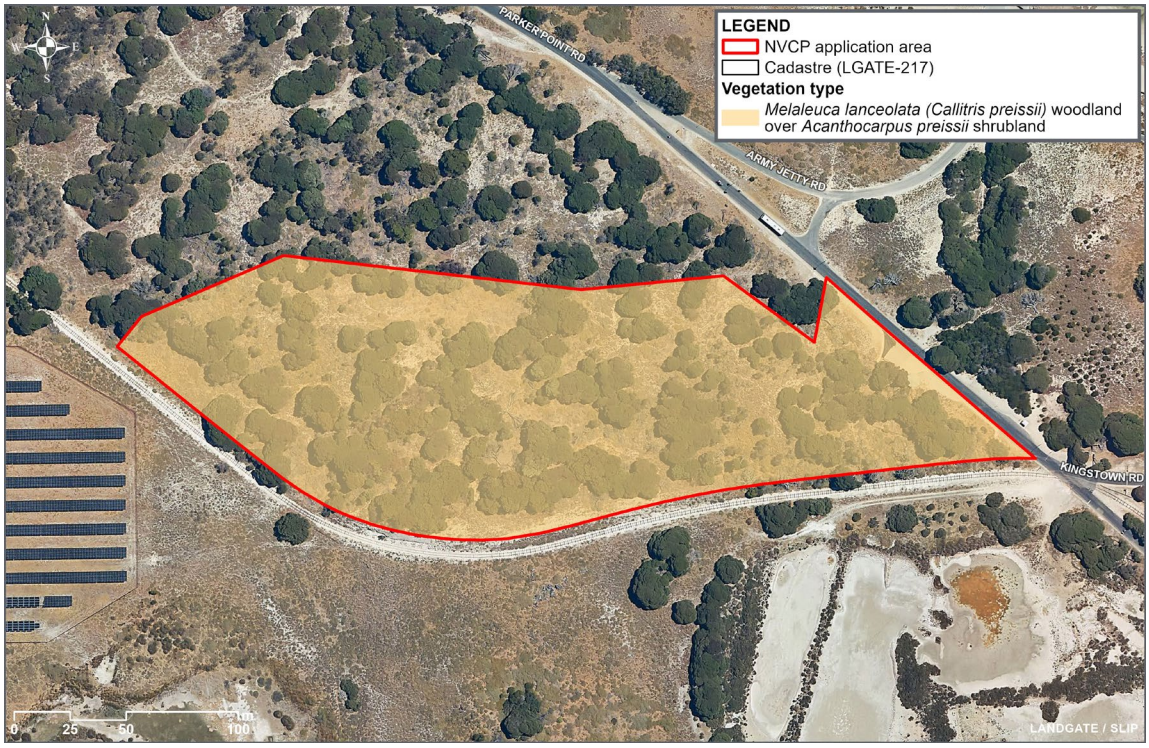

Figure 3 Vegetation in the proposed clearing area

Plate 1 *Melaleuca/Acanthocarpus* woodland

Plate 2 ***Eucalyptus utilis***

Vegetation condition was assessed as Very Good by the Scale of Keighery (1994) by Focused Vision Consulting (2022) and 360 Environmental (2022), based on Focused Vision Quadrat 11 which was placed just to the north of the proposed clearing area boundary.

'Very Good' condition, as defined by the Keighery (1994) scale, is when:

- Vegetation structure (is) altered; obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing."

A review of the Focused Vision report shows that a total of 5 taxa were recorded in the quadrat on which the condition assessment of the proposed clearing area was based, one of which is introduced (**Trachyandra divaricata*). The photo provided of Quadrat 11 (Plate 3) shows the same vegetation type as is shown in the plates displayed here from the RPS survey. While the quadrat retains some structure in the upper stratum (trees *Melaleuca lanceolata* and *Allocasuarina huegeliana,* and the shrub/tree *Acacia rostellifera*) the lower stratum is represented by two taxa, *Acanthocarpus preissii* and the weed **Trachyandra divaricata*. This shrub/herb layer can be interpreted as depauperate in that it lacks diversity as it is dominated by one native taxon and includes the presence of an aggressive weed.

Plate 3 Focused Vision Quadrat 11 (from Focused Vision 2022)

During the RPS survey vegetation condition was assessed to differ from that previously mapped. Using the scale of Keighery (1994) RPS assessed the vegetation condition as Degraded with patches of Good, with a small patch around a shelter and interpretive installation as Completely Degraded/Cleared (Figure 4).

Figure 4 RPS vegetation condition assessment

The vegetation within the proposed clearing area was also found to be depauperate in the shrub layer, also being dominated by the *Acanthocarpus preissii*. Occasional *Guichenotia ledifolia* and *Lysianthus calycinus*

were noted, however, the introduced species **Trachyandra divaricata* was more common and widely distributed. The relevant Keighery scale (1994) condition definitions are:

- Good: Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weed at high density, 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 and shrubs.

There have been multiple disturbances to the vegetation in the NVCP site:

- Historical photography (Plate 4) shows the area as cleared at the time of taking (1981);
- Poole *et al* (2014) notes that intensive browsing by the Quokka has substantially impaired revegetation on Rottnest, and as *Acanthocarpus preissii* is not shown to be a preferred food plant it can be inferred that the taxon has benefitted from the selective grazing pressure reducing competition for space. As a food plant for Quokka, **Trachyandra divaricata* was recorded in 68.7% of faecal samples (second only to *Guichenotia ledifolia* at 77.6%) as opposed to 0% for *Acanthocarpus preissii* (Poole *et al*, 2014);
- Phillips (2016) found that the density of Quokkas was significantly higher around the Settlement areas and this was correlated with tourism, escalating to its highest point around summer. It could be argued that this density is a man-made phenomenon and that overgrazing of palatable species (eg *Guichenotia ledifolia*) in the Settlement area or nearby is a result of human influence; and
- Weed invasion particularly by **Trachyandra divaricata* (and to a lesser extent **Asphodelus fistulosus*), and deliberate introduction of non-endemic species.

Plate 4 1981 orthophoto, approximate clearing area in red (photo courtesy of RIA).

RPS considers these disturbances to constitute a severe impact to the vegetation and its structure and therefore considers the vegetation to be in a Degraded condition over the majority of the proposed clearing area, with patches that may be considered Good. Plates 4 & 5 show the degraded nature of the vegetation.

One small area at the southern end of the proposed clearing area was assessed as 'Completely Degraded'. This area appears to have been established as an interpretive site for the Noongar seasons and various bush foods and other useful plants, with a gazebo and boardwalk in a fenced area. Currently, despite the upper stratum cover of *Melaleuca lanceolata*, there is little growing inside the fenced area except **Trachyandra divaricata*. The area can be said to be 'Parkland Cleared'.

Plate 5 Degraded vegetation on dune

Plate 6 Degraded stand of *Melaleuca lanceolata*

Conservation significant flora

No conservation significant flora were recorded in the proposed clearing area.

Conclusion

The vegetation in the NVCP site is analogous to the state listed TEC "*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain (floristic community type 30a as originally described by Gibson *et. al.* 1994)". This TEC is listed as Critically Endangered.

The vegetation has been subject to multiple disturbances and is currently in a Good (small patches) to Completely Degraded condition. This does not match the condition mapping in the Focused Vision Consulting (2022) report, which was achieved largely by extrapolation of the condition from a single quadrat placed just outside the boundary of the proposed clearing area.

Yours sincerely,
for RPS AAP Consulting Pty Ltd

Martin Henson
Lead Botanist
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+61 8 9211 3533

References

EPA, (2016) *Environmental Factor Guideline: Flora and vegetation*. Environmental Protection Authority, Perth, WA. Available at: http://www.epa.wa.gov.au/sites/default/files/Policies_and_Guidance/Guideline-Flora-Vegetation-131216_4.pdf

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Landgate (2023) *Landgate Viewer Plus* https://map-viewer-plus.app.landgate.wa.gov.au/index.html Accessed September 2023.

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Poole, HL, Mukaromah, L, Kobryn, HT and Fleming PA (2014) *Spatial analysis of limiting resources on an island: diet and shelter use reveal sites of conservation importance for the Rottnest Island Quokka* Wildlife Research, 2014, **41** pp 510-521.

State of Western Australia (2023) *Government Gazette No. 62 of 2023: Biodiversity Conservation (Threatened Ecological Communities) Order 2023* Government Printer, State of Western Australia

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360 Environmental (2022) *Parker Point Road Rottnest: Native Vegetation Clearing Permit: Supporting Documentation* Unpublished report prepared for the Rottnest Island Authority

Attachment 1B: Request for Information Responses

ROTTNEST ISLAND AUTHORITY

Our Ref:23/48

My Ryan Mincham
ryan.mincham@dwer.wa.gov.au
Manager
Department of Water and Environmental Regulation
Native Vegetation Regulation - Regulatory Services

To Mr Mincham

APPLICATION TO CLEAR NATIVE VEGETATION UNDER THE ENVIRONMENTAL PROTECTION ACT 1986 – CPS 10450/1 – REQUEST FOR FURTHER INFORMATION

Please see the below responses to the Request For Information dated 12 January 2024 and follow up email dated 9 May 2024 from our meeting on the 8 May 2024, raised by the Department, as well as the Department of Biodiversity of Conservation and Attractions, Species and Communities Branch.

The RIA are responsible under the *Rottnest Island Authority Act 1987* for the conservation and protection of the Islands flora and fauna while providing tourism facilities and experiences. Funding of $98 million was approved as part of the 2024-25 Budget for the construction of staff accommodation on the Island. The areas within the settlement are limited for development.

If you have any questions, please contact Rebecca Gabbitus or David Pond.

Regards

Jason Banks
EXECUTIVE DIRECTOR

Schedule 1 – Additional information requested

Item	Information requirements	Specifications	Rationale	RIA Response
1.	Evidence of efforts taken to avoid and/or mitigate significant environmental impacts resulting from the proposed clearing.	Implementation of the mitigation hierarchy is required to avoid or mitigate significant environmental impacts resulting from the proposed clearing: **Avoidance measures** may include modifications to the area proposed to be cleared or alternative designs in order to retain the significant environmental values. Any proposed modifications to the area to be cleared must be accompanied by updated maps and/or digital files reflecting these proposed changes. **Mitigation measures** may include implementation of onsite impact mitigation strategies that reduce impacts from the proposed clearing. If evidence of efforts taken in accordance with the mitigation hierarchy are provided but are not sufficient to counterbalance the residual significant environmental impacts, suitable environmental offsets may be considered as discussed under Item 2 and as detailed in Principle 1 of the *WA Environmental Offsets Policy* (2011).	The preliminary assessment has identified that the area proposed to be cleared comprises of vegetation representative of a state listed critically endangered threatened ecological community (TEC) and constitutes suitable habitat for several conservation significant fauna species. Threatened ecological community: The DWER preliminary assessment and information provided by the applicant indicate that the proposed clearing will impact approximately 3.29 hectares of native vegetation analogous to '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain (floristic community type 30a as originally described in Gibson et al. (1994)' (SCP30a) TEC. Threatened fauna: The application area may also provide suitable habitat for several threatened and priority fauna species. **The quokka** (*Setonix brachyurus*) is listed as vulnerable under both State and Federal legislation. Rottnest Island Authority (RIA) staff and RPS botanist have sighted Quokka scats within the site, and it is likely that suitable habitat for this species is present within the site. **Rottnest Island dugite** (*Pseudonaja affinis exilis,* priority – 4) habitats include coastal dunes, heathlands, shrublands, woodlands and forests. It seems to cope well with heavily degraded habitats such as golf course, industrial parks and open agricultural country. Dugites were observed on site as per RIA site inspection. **Rottnest Island bobtail** (*Tiliqua rugosa konowi*) is listed as vulnerable. Their usual habitat of the	RIA addressed the selection for alternatives within the application. Development is detailed under section 14 of the Act: Limit on development (1) The Authority — (a) shall not provide any living accommodation on the island except in the settlement area; and (b) shall carry out any development outside the settlement area, not being a development provided for in the management plan referred to in section 17(1), only with the approval of the Minister and in accordance with such conditions as the Minister may impose. Alternative site locations have been considered, however, due to siting of utilities, heritage registered sites, and environmental factors, alternative sites were eliminated. The RIA have identified during surveys conducted by qualified consultants, that the vegetation of the area is analogous with TEC SPC 30a and subsequently submitted this Native Vegetation Clearing Permit and will submit a Section 45 to Species and communities. To mitigate the impacts the RIA have: - Presented an offset for the clearing; - Continue to undertake their Woodland Management program; - Provided management mitigation measures to be carried out during clearing to prevent over clearing; and - Provided a commitment to develop a CEMP and OEMP for the site.

Item	Information requirements	Specifications	Rationale	RIA Response
			species includes shrub lands, eucalyptus forests, desert grasslands, and sandy dunes. They often shelter in the bush under low foliage. Information provided by the applicant confirms the presence of bobtails on site. **Perth slider** (*Lerista lineata*), a priority-3), is found in summer- scented wattle (*Acacia rostellifera*) scrub. The perth slider has a very fragmented distribution and has suffered significant habitat loss. The most recent observations were in 2015 in *Acacia rostellifera* scrub, but it is not stated that this is its preferred habitat. According to RPS site inspection (2023), *Acacia rostellifera* was noted in the proposed clearing area, it is possible that this species utilises the area. **Swan Coastal Plain shield-backed trapdoor spider** occurs within Banksia woodland and heathland on sandy soils (Rix et al., 2018), and has been previously recorded on Rottnest Island. As the proposed clearing area is on sandy soil, this species may occur within the application area. The department notes that the applicant has provided justification for the site selection, however, given the likely impact to the above-mentioned environmental values, evidence of additional efforts to avoid and/or mitigate the need for clearing are required to be provided. These may include detailed design drawings of the proposed staff housing that considers retention of trees, A Bushfire Attack Level assessment report that confirms the need to clear to the extent required and the Construction Environmental Management Plan (mentioned in the cover letter). Further, a public submission received for the clearing permit application has sought clarification how the Construction Management Plan will mitigate runoff, erosion and wetland habitat loss from the proposal. As such, please ensure your response addresses this matter.	A CEMP and OEMP will be developed as part of the project. This will include: - Vegetation clearing will be minimized where possible. - The clearing area required will be demarcated prior to clearing to ensure no over clearing and ensure protection of the adjacent registered heritage site. - Clearing will be conducted in a way which will allow fauna to vacate. - Surface water management measures to ensure that no surface water leaves site (to infiltrate) and erosion control measures. - There is no wetland vegetation within the proposed planned clearing area. - All works will be retained within the clearing footprint. - A 5m buffer is in place from the rail centerline to ensure compliance with all rail safety legislation. - Management of fauna during clearing and during operational times. - Management of bushfire protection zones. - BAL assessment requirements

Item	Information requirements	Specifications	Rationale	RIA Response
2.	Identification of satisfactory environmental offsets.	If efforts taken in accordance with the mitigation hierarchy as discussed under Item 1 are not sufficient to counterbalance the residual significant environmental impacts, a satisfactory environmental offset may be considered, as detailed in Principle 1 of the WA Environmental Offsets Policy (2011). Proposed environmental offsets are to be submitted using Appendix A of the Clearing of native vegetation – offsets procedure guideline, available via the department's website. The WA Environmental Offsets Policy (2011) and WA Environmental Offsets Guidelines (2014) outline the assessment and decision making processes around the use of environmental offsets.	The preliminary assessment has identified that the area proposed to be cleared comprises significant habitat for a threatened ecological community and several conservation significant fauna species. If the efforts taken to avoid and/or mitigate the need for clearing under Item 1 are not sufficient to counterbalance the residual impacts, an environmental offset is required to counterbalance the remaining significant residual impacts of the proposed clearing. Based on the current application area, the significant residual impacts of the proposed clearing include approximately 3.29 hectares of native vegetation that is analogous to the state listed critically endangered TEC SCP30a. An indicative offset calculation to assist in the preparation of the final offset for the application has identified that revegetation of an area of 8.36 hectares with native vegetation that is representative of the SCP30a TEC from a 'Degraded' to 'Good to Very Good' condition, may be sufficient to adequately address the impacts of the proposed clearing. This calculation was based on the offset provided for CPS 9883/1, assuming a similar revegetation offset will be proposed for this project within Rottnest Island. Please note that for revegetation to be considered as a proposed offset, a comprehensive revegetation plan will be required, and the site would have to be conserved in perpetuity. The department's A guide to preparing revegetation plans for clearing permits is available on the department's website at: https://dwer.wa.gov.au/regulatory-documents. The revegetation plan prepared for CPS 9883/1 can be used as a guide and modified	Under the RIA Act and Regulations (Section 48) the RIA are responsible for the management and control of, and the maintenance of good order on, the Island along with the protection and repair of the natural environment, fauna and flora, and man-made resources of the Island. The RIA submitted the revegetation plan as part of the application. The RIA based this Plan on DWER's guidance titled 'A guide to preparing revegetation plans for clearing permits' and the previous approved plan submitted by RIA which was noted as a suggestion by DWER in the RFI. The RIA believe that the offset package presented meets the criteria and is in line with the WA environmental Offset Policy which stipulates that options for avoidance and mitigation have been pursued and will enable the expansion of Woodland area on Wadjemup. The RIA conduct weed management in line with their weed management plan. The commitments in the weed management plan are to monitor and manage weeds of Wadjemup. The objectives are to control all declared weeds and control weed fronts and where possible reduce weed infestations. The RIA have committed funds to carry out the offset commitments and ongoing Island wide weed monitoring and management.

Item	Information requirements	Specifications	Rationale	RIA Response
			accordingly for this clearing permit application.	
3.	Confirmation of the presence and condition of the SCP30a TEC area proposed to be cleared.	All surveys must be submitted in accordance with the EPA's Instructions for the preparation of data packages for the Index of Biodiversity Surveys for Assessments (IBSA), and submitted via the department's IBSA Submissions Portal. Please provide the corresponding IBSA Submissions Reference Number to the assessing officer, using the contact details located on the top right of the attached letter, once the survey has been submitted. NOTE: The department defines a "botanist" as a person who holds a tertiary qualification in environmental science or equivalent, and has a minimum of 2 years work experience in identification and surveys of flora native to the bioregion being inspected or surveyed, or who is approved by the CEO as a suitable botanist for the bioregion. NOTE: Please be advised that an occurrence of a threatened ecological community cannot be modified, unless an authorisation from the Minister for Environment is obtained under section 45 of the Biodiversity Conservation Act 2016 has been obtained from the Department of Biodiversity, Conservation and Attractions (DBCA). For further information on this matter please contact DBCA's Species and Communities Program via email sacl@dbca.wa.gov.au or view the Licences and Authorities - Threatened ecological community authorisation web page.	Information provided by the applicant indicate that the application area is analogous to SCP30a TEC. The department notes that the information provided regarding the condition of the vegetation is contradicting. Applicant has advised that in May 2022 Focused Vision Consulting conducted an initial assessment, assessing the condition as Very Good by the scale of Keighery (1994). Furthermore, in September 2023 RPS conducted a qualitative assessment of the site and assessed the vegetation as in Degraded condition with patches of Good condition by the same scale. However, the RIA, following its own inspection of the site, considers that the site is in Good condition with minor patches of Degraded condition (R. Gabbitus, pers. comm 2023). Please confirm the presence, extent and condition of the TEC by providing a map and shapefiles delineating the patch extent and condition of the TEC identified, its size (in hectares) and condition (using the Keighery scale). This additional data along with the RPS survey require to be submitted via the IBSA Submissions Portal.	The RIA identified the area as being analogous with SCP30a during the surveys conducted by qualified consultants, refer to Focus Vision Consulting Report – Principal (e) page 21 and Section 7 page 25 and RPS report page 8 Conclusion. The IBSA data has now been uploaded and available for review.

Request		RIA Response
Email 9/5/2024 (reference CPS 10450/1)	Email request following meeting 8/5/2024 seeking action items. - avoidance/minimisation (including further emphasis on the necessity for clearing and it being a State Govt priority with funding etc)	Funding of $98 million was approved as part of the 2024-25 Budget for the construction of staff accommodation on the Island. See above comments on alternative sites in the response to the RFI.
	- response to the public submission received	This will be managed in the CEMP and OEMP as outlined above in the response to the RFI.
	- management plan for SCP30a (to be endorsed by DBCA who can provide guidance to RIA on scope)	The RIA have no plans to develop a management plan for SPC30a, over existing plans in place. RIA manage all the vegetation units of Wadjemup through the Terrestrial Conservation Action Plan, which outlines all threats and monitoring in line with DBCA KPIs.
	- offset approach (DWER will await RIA's advice on opportunities for an alternate offset approach which includes rehabilitation and on-ground management activities within existing occurrences of the TEC).	DWER have indicated that they would like the southern section included in the offset plan. The RIA believe that the offset proposal presented in the application meets all criteria and at this time do not wish to include this southern section. DWER have indicated that they would like to see the southern section to be listed as TEC 30a. The RIA would like to meet with DBCA Species and Communities to discuss the proposed boundaries as they may not reflect the best outcome for the vegetation and the ongoing operations of the Island, given that this area holds operational areas. The areas of discussion would focus on the areas to the south-west of the rail line on the parker point road portion (near proposed clearing) which are effectively isolated trees separated by a rail corridor and areas within the southern section incorporate operational areas which will need to be

	-	maintained. 

ROTTNEST ISLAND AUTHORITY

Our Ref: 22/180

My Ryan Mincham
ryan.mincham@dwer.wa.gov.au
Manager
Department of Water and Environmental Regulation
Native Vegetation Regulation - Regulatory Services

To Mr Mincham,

APPLICATION TO CLEAR NATIVE VEGETATION UNDER THE ENVIRONMENTAL PROTECTION ACT 1986 – CPS 10450/1 – REQUEST FOR FURTHER INFORMATION #2

Please see the below responses to the Request For Information dated 25 June 2024 and subsequent emails and meetings.

Please see the responses below to the queries raised by the Department, as well as the Department of Biodiversity of Conservation and Attractions, Species and Communities Branch.

If you have any questions, please contact Rebecca Gabbitus, Manager Environment and Compliance - rebecca.gabbitus@dbca.wa.gov.au.

Regards

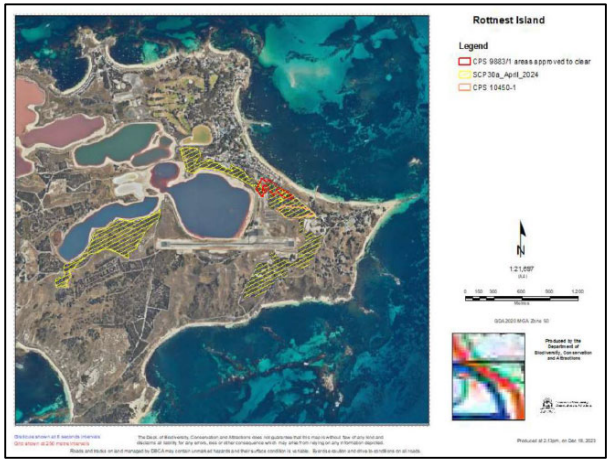
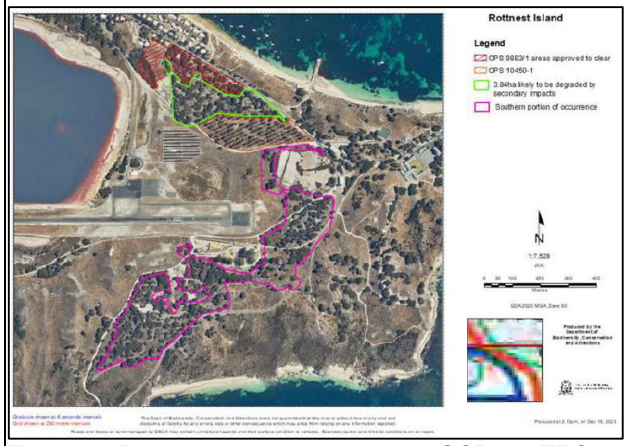
Jason Banks

Executive Director

29 October 2024

Schedule 1 – Additional information requested

Item	Information requirements	Specifications	Rationale	RIA Response
1.	Identification of satisfactory environmental offsets.	Proposed environmental offsets are to be submitted using Appendix A of the Clearing of native vegetation – offsets procedure guideline, available via the department's website. The WA Environmental Offsets Policy (2011) and WA Environmental Offsets Guidelines (2014) outline the assessment and decision making processes around the use of environmental offsets.	According to the WA Environmental Offset Guidelines (2014), one of the four levels of significance for residual impacts is: *"Significant impacts requiring an offset – any significant residual impact of this nature will require an offset. These generally relate to any impacts to species, ecosystems, or reserve areas protected by statute or where the cumulative impact is already determined to be at a critical level."* SCP30a is a Critically Endangered TEC which is highly restricted. Rottnest Island makes up 5.3% of the ~ 636-hectare total area known in Western Australia. As per DBCA advice received on 10 June 2024, the proposed works will directly impact 3.29 hectares of the TEC occurrence in this location, however, further fragmentation of the TEC may result in secondary impacts, including weed invasion, which could compromise the persistence of the adjacent TEC which occurs between CPS 9883/1 and CPS 10450/1 (~ 3.84 hectares, see green polygon in Figure 2). Noting that the RIA have not proposed any specific on-ground management to provide long-term protection for the adjacent TEC, the Department considers it appropriate to apply the precautionary principle and assume that the extent of the TEC impacted may be greater than the amount of clearing proposed. On that basis, the Department considers it important that the offset proposal incorporates on-ground management actions within existing occurrences of the TEC on Rottnest Island to protect them from ongoing impacts. DBCA has advised that the TEC occurrences on Rottnest Island have now been formally mapped and incorporated into the TEC dataset (see Figure 1). The revised mapping of the TEC has taken into account the reports and GIS data provided by RIA and further internal DBCA advice from an expert in the identification of this TEC. The Species and Communities Program continually review and update the TEC dataset based on current scientific information in relation to the vegetation composition and condition of a site. This also includes areas where the TEC occurrence is likely to regenerate if they were left undisturbed.	RIA commissioned a consultant to complete a flora survey of two areas within the central portion of the island (see Attachment 1 of the Revegetation Management Plan). The survey identified suitable areas for use in an offset strategy for CPS 10450/1 which were discussed with DWER via an email and meeting on 18 September 2024. The areas proposed to be used in the offset strategy include vegetation that is consistent with TEC SCP30a which are present in the northern and central sites shown on Attachment 1 of the Revegetation Management Plan. RIA will implement an offset strategy that includes the revegetation of portions of the northern and central sites that are present in a 'Degraded', 'Degraded-Good' or 'Good' condition. The area required to be revegetated within these two sites totals 5.46 ha, as advised by DWER on 14 October 2024. In addition, the offset strategy also includes revegetation of 8.28 ha of an area to the south of Lake Serpentine, shown on the Revegetation Management Plan. This area has not been formally surveyed, but inspection by RIA indicates the vegetation to be predominantly grasses. This area is considered suitable given that it is located adjacent to the mapped occurrence of the TEC south of Lake Serpentine and also adjacent to the offset area for CPS 9883/1. The details of revegetation to be undertaken to meet the offset requirements is outlined in the attached Revegetation Management Plan (RIA, 2024). DWER has confirmed these offset areas are suitable to counterbalance the CPS 10450/1

Item	Information requirements	Specifications	Rationale	RIA Response
			 **Figure 1:** Mapped SCP30a occurrences on Rottnest Island.  **Figure 2:** Polygons indicating mapped SCP30a TEC occurrence. In your response dated 21 May 2024, the RIA advise that the TEC occurrence mapped to the south of the proposed clearing area (see pink polygon in Figure 2), includes operational areas. On that basis, the RIA have indicated that on-ground management within this area may not be viable. While there are portions of this mapped TEC which are located in close proximity to operational areas, there would appear to be other	clearing in meeting minutes dated 14 October 2024 and follow up email dated 16 October 2024.

Item	Information requirements	Specifications	Rationale	RIA Response
			portions of the TEC which may be suitable for on-ground management activities. The Department acknowledges your correspondence dated 11 June 2024 regarding the alternative offsets that were considered, as well as the additional information on the long-term revegetation program for woodlands on Rottnest Island. The RIA has stated that it manages all the vegetation units of Wadjemup through the Terrestrial Conservation Action Plan, which outlines all threats and monitoring in line with DBCA KPIs. Please provide a copy of the Plan for consideration as the Department considers there to be insufficient detail in the information provided to evaluate whether the management and revegetation activities undertaken by the RIA are adequate in addressing DBCA's recommendation for long-term management of TEC occurrences on Rottnest Island. In the absence of further information regarding the management and revegetation activities undertaken on Rottnest Island that would provide benefit to the TEC, the Department recommends an appropriate offset strategy would comprise the following: following: 1. **Approximately 8.44 hectares of area to be revegetated to provide a buffer to the TEC (see blue polygon in Figure 3)** *Rationale: DBCA has advised that SCP30a TEC is naturally depauperate (species poor) understorey, easily degraded, not resistant to weed invasion and therefore regeneration is generally poor. Noting the advice, the originally proposed offset is not considered sufficient to completely address the impacts of the proposed clearing. Revegetation of approximately 8.44 hectares of area (blue polygon) should be considered as a buffer to the existing TEC occurrence, as the proposed revegetation is unlikely to result in complete replication of the TEC. Indicative offset calculations suggest this offset may counterbalance **60.6%** of the significant residual impacts to SCP30a TEC.* AND 1. **Revegetation of minimum 3.29 hectares of an existing degraded occurrence of the TEC** *Rationale: The clearing will result in cumulative impacts to the TEC, with potential for secondary impacts which would contribute to*	

Item	Information requirements	Specifications	Rationale	RIA Response
			*further cumulative impacts. The Department considers it important that management actions are directly targeted to improving known occurrences of the TEC on Rottnest Island. Revegetation of minimum 3.29 hectares of an existing TEC with native vegetation from a 'Degraded' to 'Good to Very Good' condition can be considered as an appropriate direct offset to counterbalance the impacts of the proposed clearing. Indicative offset calculations suggest this offset may counterbalance **39.4%** of the significant residual impacts to SCP30a TEC.* Please note that for revegetation to be considered as a proposed offset, a comprehensive revegetation plan will be required, and the site would have to be conserved in perpetuity. The department's *A guide to preparing revegetation plans for clearing permits* is available on the department's website at: https://dwer.wa.gov.au/regulatory-documents.  **Figure 3:** Revegetation site for TEC buffer	
2.	Evidence of efforts taken to avoid and/or mitigate significant environmental impacts resulting from the proposed clearing.	Further information to demonstrate appropriate consideration of options to minimise environmental impacts	The Department acknowledges the RIA's response to RFI item 1 stating "Alternative site locations have been considered, however, due to siting of utilities, heritage registered sites, and environmental factors, alternative sites were eliminated". Given the cumulative impacts that will result from the proposed clearing of a Critically Endangered TEC in good or better condition, please provide further context in relation to	The environmental factors that were considered in the selection of the Parker Pt Rd site in comparison to the three other sites are outlined below. It should be noted that whilst the following environmental factors were considered and are important to the selection of the development site, the ability to develop is fundamentally constrained by the Rottnest Island Act which limits accommodation to the

Item	Information requirements	Specifications	Rationale	RIA Response
			the environmental factors that were considered prior to selecting the proposed clearing site. This information will be captured with the Department's decision report to demonstrate that consideration has been given to options which would minimise the impacts to environmental values.	settlement area and is therefore a primary determining factor in site selection: • Proximity to ESAs: The ESA associated with Bickley Swamp intersects the southern site boundary, however, RPS (2023) concluded that the clearing and proposed development are not likely to impact Bickley Swamp due to the presence of the rail line and implementation of a CEMP. The Parker Pt Rd site was second ranked in terms of proximity to ESAs. The Geordie Bay site was ranked higher on this factor but the overall score for Geordie Bay was lower due to other factors including proximity to underground services. The two other potential sites (Garden Lake and PFM Yard) were located very close to listed ESAs/PECs and would have resulted in significant impacts to these sensitive receptors. • Proximity to work areas: Future land use planning identified that the facility maintenance contractor operational yard will be relocated in the vicinity of the Parker Pt Rd site, and near to the airport. Locating staff housing in close proximity to the operational yard will assist with the reduction of transport emissions for staff commuting. • Proximity to underground services: The Parker Pt Rd site was ranked highest compared to the other alternative sites in terms of connections to underground services including sewer, electricity and water. Installation of underground services requires significant energy and resources therefore ensuring minimal distance for connections results in fewer carbon emissions and waste.
3.	Additional measures to mitigate potential for secondary impacts to adjacent	Preparation of weed management plan for adjacent occurrence of the TEC	As per Item 1, the Department does not consider that adequate information has been provided to address the potential for secondary impacts on the TEC adjacent to the area which is proposed to be cleared (see green polygon in Figure 2).	RIA has developed a protocol for Weed Management at the offset sites associated with this Clearing Permit and also the area of remnant vegetation located between the CPS 9883/1 and CPS 10450/1 clearing areas. This

Item	Information requirements	Specifications	Rationale	RIA Response
	occurrence of the TEC		DBCA have advised that the proposed clearing will result in an increased edge to area ratio and that there is a risk that weed invasion will increase during and following clearing. This is likely to cause a decline in condition and subsequent replacement of key functional biota to the uncleared 3.84 ha of the TEC occurrence at the site. In order to mitigate the risk of secondary impacts to the adjacent occurrence of the TEC, a weed management plan will be required for the 3.84 hectare patch of TEC north of application area. The requirement to implement the weed management plan would be imposed as a condition on the clearing permit.	protocol is included as Appendix A in the Revegetation Management Plan for CPS 10450/1. This protocol applies to the management of weeds within the stated areas. Additional measures that RIA will implement to mitigate potential impacts to the TEC located between the CPS 9883/1 and CPS 10450/1 clearing areas includes: • Signage • Exclusion fencing where appropriate.

ROTTNEST ISLAND AUTHORITY

Our Ref: 22/180

Office of the Appeals Convenor
Renee Dornford
Appeals Registrar
Environmental Protection Act 1986

To Ms Dornford,

APPEAL AGAINST GRANT OF CLEARING PERMIT CPS 10450/1 LOT 10976 ON DEPOSITED PLAN 216860, ROTTNEST ISLAND

Please see the below responses prepared by the Rottnest Island Authority to the Appeal received by the Office of the Appeals Convenor against the grant of CPS 10450/1.

If you have any questions, please contact Rebecca Gabbitus (0418 101 151) or David Pond (0451 154 505).

Yours sincerely

Jason Banks

Executive Director

16 January 2025

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Response to Appeal

Item	Information requirements	Specifications	RIA Response
1.	The Decision to approve the Proposal will result in residual impacts to a Threatened Ecological Community	**a.** The development envelope for the Proposal will result in the permanent loss of native vegetation, which provides habitat for conservation significant species and which stabilises the land against erosion. The Proposal will result in the clearing of a Threatened Ecological Community (**TEC**) '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands of the Swan Coastal Plain' and therefore is at variance with Native Vegetation Clearing Principles: (c) it includes, or is necessary for the continued existence of, threatened flora; (d) it comprises the whole or a part of, or is necessary for the maintenance of, a threatened ecological community; (e) it is significant as a remnant of native vegetation in an area that has been extensively cleared; (g) the clearing of the vegetation is likely to cause appreciable land degradation; and (h) the clearing of the vegetation is likely to have an impact on the environmental values of any adjacent or nearby conservation area. Furthermore, under conditions of clearing; additional clearing for fire safety (after accommodation is built); increased risk of introduction of invasive species; climate change; and increased visitors, the ecology of Wadjemup will be residually impacted by the Proposal, both directly and indirectly. **b**. The Decision Report notes the significant risks to the TEC from clearing and from secondary impacts, resulting the potential loss of 7.1 ha of the TEC, and cumulatively, alongside other nearby clearing projects on Wadjemup, will result in a loss of 9.37 ha of the TEC. This represents **11.83%** of the known occurrences of the TEC on Wadjemup. *Taking into account the additional advice received from DBCA (2024), DWER is of the view that the proposed clearing will result in cumulative impacts on the TEC, which places greater importance on the need to protect other occurrences of the TEC on Rottnest Island. Through the detailed assessment outlined in Section 3.2 above, the Delegated Officer has determined that the following significant residual impacts remain after the application of the avoidance and mitigation measures summarised in Section 3.1. (Decision Report p9).* Therefore, there remains doubt as to the capacity of the offset	**a.** The assessment of the proposed clearing against the 10 clearing principles completed by RPS (2023) identified the following: • (c) no threatened or priority flora were identified. • (d) yes the clearing is at variance with this principle. • (e) no, the extent of the mapped vegetation type and native vegetation in the local area are both consistent with the national objectives and targets for biodiversity conservation in Australia. • (g) land degradation will be minimised through implementation of a Construction Environmental Management Plan (CEMP) that will include actions to manage erosion, sedimentation, stormwater which are further detailed below. • (h) impacts to sensitive receptors and areas of conservation significance will be minimised through implementation of a CEMP. RIA will undertake weed management in the remnant TEC located between clearing areas 9883/1 and 10450/1. **b.** DWER have identified that the clearing will have cumulative impacts on the remnant TEC, hence the reason why RIA will undertake a significant amount of revegetation via offset planting. A cumulative total of 19.51ha of woodland will be revegetated comprising 13.74 ha to offset CPS 10450/1, and 5.77ha to offset CPS 9883/1. This is in addition to revegetation that RIA undertakes as part of its Woodland Management Plan. Revegetation as outlined in the Woodland Management Plan and proposed offset areas have been selected with the aim of linking and increasing connectivity between existing woodland areas. Over the past 5 years the RIA have been mapping the extent of woodland which meets the TEC criteria. As of December 2024 there is 106.35 ha of vegetation that meets the criteria for TEC 30a which comprises areas that have been mapped officially by DBCA

Commented [RG1]: We need to address the % comment.

Commented [RG2R1]: Chris calculated that there is roughly 3,200,469 square metres as Woodland

Now this is probably not all confirmed TEC

We need to sit down and work it out

Commented [RG3R1]: Did chris finish that layer

Item	Information requirements	Specifications	RIA Response
		mitigation, through revegetation, to be an effective measure to counter the impacts to the TEC. That the offset comprises primarily revegetation of an existing area of the TEC, elsewhere on Wadjemup, places the burden of ecological function on the TEC on other parts of Wadjemup, while sacrificing and fragmenting the Proposal area. Further compounding the risks to flora in the Proposal area are the risks from soil erosion and hydrological impacts from the Proposal. "Soils within the application area have a moderate risk of wind erosion, water erosion, and phosphorus export and a low risk of other land degradation impacts (refer to Table C.6)" (Decision Report p13). CCWA argues that DWER did not adequately consider the significance of the risks to the TEC and did not adequately consider avoidance measures to address the residual impacts from the Proposal.	(27.51ha) and identified by suitably qualified botanists on Wadjemup (78.84ha). In the state of Western Australia there is an estimated 687.34 ha of TEC 30a. Of the known mapped 637ha, the area of TEC 30a on Wadjemup equates to 15.4% Up to 3.29ha of TEC 30a will be cleared for CPS 10450/1 and 2.78ha of TEC 30a will be cleared for CPS 9883/1 which equates to 6.07ha in total. The RIA will implement a series of actions to minimise disturbance to the remnant TEC located between the two clearing areas as outlined below, and as such RIA considers that this area should not be counted in the cumulative loss total. The cumulative impact of the loss of 6.07ha of TEC 30a from Wadjemup equates to 5.70% on Wadjemup. In addition, RIA will be undertaking a range of other actions to reduce the cumulative risk to the remnant TEC on the island including: • Weed management as outlined in the Revegetation Management Plan. • Implementation of a CEMP that will include actions to mitigate wind and water erosion including minimising clearing, limiting exposed soil following clearing, use of mulch, grading of exposed soils to increase infiltration. • Aspects of the development that will mitigate wind and water erosion including stormwater management (no surface water leaving site), drainage/swales, retention of trees and vegetation where possible, planting of local species and mulching in exposed areas. • Signage and exclusion fencing (where appropriate) for the area of remnant TEC between clearing areas 9883/1 and 10450/1. • As an additional contingency for the protection of Bickley Swamp, it is noted that the rail line provides a physical barrier to water runoff in addition to the erosion control measures outlined above.
2.	The Decision to approve the Proposal will result in residual impacts to conservation significant fauna.	**a**. The supporting document for the South Thompson Development Barge Loading project (p43) lists 44 threatened species and 102 migratory species in the area. This document also notes a range of important environmental concerns raised during the consultations for this project, including potential impacts to the terrestrial and marine environment, from land clearing; impact to Quokka populations; noise; and water and	**a.** The South Thomson Barge Landing Development is a separate project that has gone through environmental referrals with both the WA EPA and Commonwealth DCCEEW. This project is predominantly a marine-based project and as such has limited relevance to this terrestrial Clearing Permit and the majority of the listed marine species are not present in the Clearing area.

Commented [PD4]: There are no DA conditions, this development is not subject to Development Approval.

Item	Information requirements	Specifications	RIA Response
		light pollution. The Proposal, which involves clearing of land to increase worker accommodation will likely cause both direct and indirect impacts to the 146 conservation significant fauna species and the ecological receptors and, accordingly, will be at variance to both state and federal environmental criteria.	Environmental Consultants RPS (2023), identified eight conservation significant species potentially occurring in the Clearing Area which is 5% of the conservation significant species identified for the barge landing project.
		b. Native Vegetation Clearing Principles The Proposal is at variance to Native Vegetation Clearing Principle '(b) it comprises the whole or a part of, or is necessary for the maintenance of, a significant habitat for fauna'. A brief discussion on the key fauna noted in the Decision Report follows:	**b.** In assessing this Clearing Permit (CPS 10450/1), the DWER has regulatory authority to refer the project to the WA EPA for assessment if the project is deemed to have potential for significant impact to the environment. However, this did not occur in this case which demonstrates that a Clearing Permit was the most appropriate means of assessment. In addition, a project may be referred under the federal EPBC Act for assessment as a Controlled Action if the project is expected to have a significant impact on a listed Matter National Environmental Significance (MNES). Significant impact guidelines include: • Lead to a long-term decrease in the size of a population. • Reduce the area of occupancy of the species. • Fragment an existing population into two or more populations. • Adversely affect habitat critical to the survival of a species. • Disrupt the breeding cycle of a population. • Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline. • Result in invasive species that are harmful to a critically endangered or endangered species becoming established in the endangered or critically endangered species' habitat. • Introduce diseases that may cause the species to decline. • Interfere with the recovery of the species. A review of the potential impacts to each of the key fauna identified with consideration of referrals to the WA EPA and MNES are provided below:
		c. Quokka The DCCEEW guide for decision makers lists a range of activities that may result in significant impacts to Quokkas. The activities that could result from the Proposal have been emphasised (below): *Under the Commonwealth EPBC Act any person proposing to undertake actions which may have a significant impact on listed threatened species (including the quokka) should refer the action to the Minister for Environment. The Minister will determine whether the action requires*	**c. Quokka** RIA have monitored quokka populations on Wadjemup for over 10 years, and the RIA have a good understanding of the density of quokkas for each of the island vegetation types. RIA have determined that woodlands have a density of 5.95 quokkas per hectare (RIA 2022 Quokka Survey – internal publication). Based on this the clearing for the project is likely to impact on 19 individuals or 0.2% of the total population.

Item	Information requirements	Specifications	RIA Response
		EPBC Act assessment and approval. As these provisions relate to proposed future actions, they can include actions which may result in increased impact from existing threats or potential threats, and actions which may result in a new threat. Actions occurring within habitat critical to survival that result in any of the following may have a significant impact on the quokka: • *Any increase in the fragmentation of habitat.* • *Any increase in numbers of feral foxes or cats.* • *A reduction of the complexity or density of understorey vegetation. For example because of feral pig activity or anthropogenic changes in hydrology.* • *Any introduction of Phytophthora dieback.* • *Inappropriate fire regimes which result in fragmentation or loss of suitable habitat.* • *Any increase in human activity that leads to degradation of habitat.* • *Any significant increase in land clearing that leads to cumulative loss or degradation of available foraging, nesting, feeding, hibernation or migration habitat.* • *Clearing of existing habitat that is to be off-set by revegetation at another location that results in a net loss in the short or long-term.* • *Any action that prevents natural regeneration of habitat.* • *Any modifications/reductions in the area of existing habitat through flooding and other water engineering structures within or adjacent to identified quokka habitat.* • *Any reduction in environmental water availability that reduces the density and persistence of the vegetation comprising the habitat.* • *Actions leading to chemical contamination of habitat associated with activation of acid sulphate soils, application of mosquito control and agricultural chemicals.* (DCCEEW Quokka Recovery Plan p17 emphasis added). Moreover, DCCEEW recognises the importance of maintaining and restoring quokka habitat to produce positive economic benefits for tourism (DCCEEW Quokka Recovery Plan p14). Accordingly, the removal of wildlife habitat for staff accommodation undermines the aim to support better tourism outcomes. The Decision Report for the Proposal states that "Despite the high level of disturbance on Rottnest Island, the species' population on the island is large compared to that on the mainland (estimated as between 8,000-12,000 individuals in 2012) (DEC, 2013) and the island population is considered resilient to current levels of disturbance (DCCEEW, n.d.). As such, it is considered that the proposed clearing is	The RIA will implement a number of management actions for protection of these individuals during clearing which aligns with the conditions of the Clearing Permit. These include the implementation of a Construction Environmental Management Plan (CEMP). The CEMP will include: • Vegetation clearing will be minimised where possible. • The clearing area required will be demarcated prior to clearing to ensure no over clearing and ensure protection of the registered heritage site. • Clearing will be conducted in a way which will allow fauna to vacate or be relocated. • Management of fauna by a fauna specialist including ceasing clearing where fauna are identified, relocation of fauna and record keeping. • All works will be retained within the clearing footprint. In addition, the RIA have committed to: • Offset planting (13.74ha for CPS 10450/1) as outlined earlier in this response. • Implementation of the Woodland Management Plan which is a revegetation strategy for Wadjemup that will increase connectivity between existing woodland areas. • Weed management as outlined in the Revegetation Management Plan. As noted above, clearing will occur in a manner that will allow fauna to relocate/be relocated, so the estimated 19 individual quokkas would not be impacted and no fauna will be harmed. Therefore, the clearing is not expected to result in a significant impact to the species and additional state referrals or EPBC referral is not required. RIA will continue to monitor Quokka populations across the island and contribute to conservation efforts to maintain the population.

Item	Information requirements	Specifications	RIA Response
		unlikely to result in impacts to the conservation status of quokka. Impacts to individuals that may be utilising the habitat at the time of clearing will be mitigated through fauna management conditions on the permit" (p6 emphasis added). CCWA asserts that the Proposal is to support additional visitors to Wadjemup and, therefore, the DCCEEW assessment (no date), cited in the Decision Report, inadequately reflects on this and should not be used to justify increased disturbance. Further, the DEC study cites 2012 population levels and should not have been used to define risk for future visitor numbers.	
		d. **Rottnest Island Bobtail** The Decision Report evaluation for the Rottnest Island Bobtail is sparse and is based on a speculative assessment that further clearing will not impact the species.	d. **Rottnest Island Bobtail** The Bobtail is widespread across the island, having been observed by conservation staff regularly. The habitat of the Clearing Area is not the preferred habitat of Bobtails (preferring limestone heath, coastal and woodland areas), although individuals have been sighted within the Clearing Site (360 Environmental, 2022; RPS, 2023). Whilst no data on population density is available for the island or the Clearing Area specifically, based on observations gathered from across the island, it is reasonable to expect that the Bobtail population is healthy. As outlined in RPS (2023) and 360 Environmental (2022), the Bobtail is likely to use the Clearing Area as habitat, although the clearing of 3.29 ha of vegetation is not likely to have a significant impact on this species. Clearing will occur in a manner that will allow fauna to relocate/be relocated, so it is reasonable to expect that any Bobtail in the Clearing Area would not be impacted. Therefore, the clearing is not expected to result in a significant impact to the species and additional state referrals or EPBC referral is not considered to be required.
		e. **Swan Coastal Plain Shield-backed Trapdoor Spider, Perth Slider, and** The Swan Coastal Plain Shield-backed Trapdoor Spider is not confirmed from the area, however, its presence on Wadjemup could be significant in terms of genetic differences due to isolation from mainland populations. This species would be highly vulnerable to landclearing and requires a more detailed risk assessment.	e. **Swan Coastal Plain Shield-backed Trapdoor Spider** This spider is known as a widespread short-range endemic. Whilst no surveys of the occurrence of this species have been undertaken at the island, it is believed the spider is widespread. RIA have contacted scientists at Perth Museum to obtain an opinion on the vulnerability or population health of this species. Perth Museum were not concerned, and did not consider a survey to be required. Whilst the presence of this species within the Clearing Area or size

Item	Information requirements	Specifications	RIA Response
		f. Perth Slider The Perth Slider, a rare, small, ground-dwelling skink, is especially vulnerable to land clearing. Its presence on Wadjemup has been recently confirmed, but its conservation status and vulnerability appear to have been downplayed in the Decision Report. Furthermore, while the species was found in association with *Acacia rostellifera*, this is not an exclusive association for the species. The Decision Report conditions to provide "slow, directional clearing to allow fauna to move into adjacent vegetation ahead of the clearing activity will minimise impact to individuals" (p7) does not consider the risks to the small, slow moving, and underground dwelling species, identified in the Decision Report. These species are unlikely to benefit from the conditions imposed to protect the larger, more visible and more mobile species. CCWA believes there should have been an updated risk assessment for the Perth Slider in the Proposal area. **g. Rottnest Island Dugite** The risk assessment in the Decision Report for the Rottnest Island Dugite is similarly lacking in detail. CCWA submits that the Proposal will produce direct impact to conservation significant fauna through loss of habitat and indirect impact through other activities to support increased tourism.	of population at the island is not entirely known, the broader species population is considered to be widespread therefore significant impact is not expected to be encountered as a result of the clearing. **f. Perth Slider** As outlined in 360 Environmental (2022), the Perth Slider skink was last recorded at the island in 2016 within *Acacia rostellifera* scrub. This type of vegetation was recorded within the Clearing Area by RPS (2023) but it was not a dominant vegetation type such as Melaleuca or Acanthocarpus. There have been no other reports of the species at the island, therefore RPS (2023) and 360 Environmental (2022) consider that this species may be present. It is reasonable to expect that the risk of individuals being present within the Clearing Area is low based on the above-mentioned information. Therefore, the clearing is not expected to result in a significant impact and additional state referrals or EPBC referral is not considered to be required. **g. Rottnest Island Dugite** The Dugite is widespread across the island, having been observed by RIA staff and the public regularly and was also observed in the Clearing Area (RPS 2023). Calls to the Rottnest Rangers to remove snakes from accommodation buildings by the public is a daily occurrence in spring and summer. This includes in accommodation areas such as Discovery that comprise a mix of buildings interspersed by pathways and areas of ground cover vegetation similar to the proposed staff accommodation. This indicates the Dugite reinhabits developed areas that were the subject of clearing. The Dugite population is not considered to have the potential to be impacted by the development. Clearing will occur in a manner that will allow fauna to relocate/be relocated, so it is reasonable to expect that any Dugite in the Clearing Area would not be impacted. Therefore, the clearing is not expected to result in a significant impact and additional state referrals or EPBC referral is not considered to be required.

Item	Information requirements	Specifications	RIA Response
3.	The Decision to approve the Proposal will result in an unsustainable increase in the number of visitors to Wadjemup	The primary justification for the Proposal is to support the growth in demand for services, to address the anticipated growth in visitors to Wadjemup. It is this rationalisation that is at odds with the protection of a Class A Reserve. Whether the increase in visitors is desirable or sustainable should have framed the Decision. While the historical anthropogenic impacts to Wadjemup are noted in the environmental review for the South Thompson Development Barge Loading project (EPA new referral p55), any proposal to increase the services for increased visitors to Wadjemup, is at variance with the goals of preventing further anthropogenic impacts. The indirect environmental impacts that could result from the Proposal and from increased staff and tourism to Wadjemup, include those relating to the need for increased loading and transport (evidenced in the South Thompson Development Barge Loading project); increased shipping movements; and from the additional emissions from the new development. These indirect impacts should have been considered for the Proposal.	As outlined in the Clearing Permit application, the proposed clearing is for provision of staff housing to support tourism and operational services at the island. The *Rottnest Island Authority Act 1987* Section 11(2) and the gazettal of the Class A reserve status determines that the purpose of the Island is: (a) To provide and operate recreational and holiday facilities on the Island; and (b) To protect the flora and fauna of the Island; and (c) To maintain and protect the natural environment and the man-made resources of the Island and, to the extent that the Authority's resources allow, repair it's natural environment. Therefore, as legislated, a primary function of the Rottnest Island Authority is to develop (provide) and operate infrastructure such as staff housing and barge facilities on the Island. All proposed infrastructure is in line with relevant legislation, and considers RIA's statutory role to also protect flora and fauna.

Attachment 2: RIA Workers Accommodation Green House Gas Project Emissions

PLEIADES

On behalf of

Rottnest Island Authoity

Wadjemup Workers Accommodation GHG Project Emissions

April 2025

Prepared by: SWN

Table of Contents

1 Summary

Life Cycle Estimations of Greenhouse Gas Emissions for Wadjemup Workers Accommodation in this report have been prepared in accordance with the Infrastructure NSW Embodied Carbon Measurement For Infrastructure (ECMI) Technical Standard with methodologies sourced from the Infrastructure Sustainability Council Technical Manual V2.1 Design Criteria for RSO-6 Material Life Cycle Impact Measurement and Management, the NSW Transport Authorities Greenhouse Group (TAGG) Workbook 2013, the National Greenhouse Accounts Factors (2024), the National Greenhouse and Energy Reporting (NGER) Measurement Determination 2008 as amended, and relevant current Environmental Product Declarations for select materials.

Total Estimated Life Cycle Greenhouse Gas Emissions for Materials, Transport, Construction, and Operation of the proposed Wadjemup Workers Accommodation are expected to be:

Total Emissions = 9,213 tCO2e

These Life Cycle Emissions are broken down into the following categories:

Construction Elements

Scope 1 Civil Works = 771 tCO2-e

Scope 2 Module Units = 604 tCO2-e

Scope 3 Material Life Cycle Emissions = 2,482 tCO2-e

Operation Elements

Scope 1 Maintenance = 2 tCO2-e

Scope 2 Electricity Usage = 1,608 tCO2-e

Scope 3 Waste and Waste Water = 3,745 tCO2-e

Medium benchmarks for Modular Units in terms of kg/CO2e/GFA sourced from the ECMI have been used to estimate Construction and Materials Embodied Emissions in the absence of data from a complete design specification.

2 Project Emissions Boundary

2.1 Project Description

Rottnest Island Authority is planning to develop new worker accommodation that will support island businesses, enhance the visitor experience, and meet growing tourism needs for Wadjemup / Rottnest Island.

The proposed development will provide self-contained accommodation for up to 336 Rottnest Island workers. Implemented in stages to minimise disruption and align with increasing visitor numbers, the project is scheduled for completion by 2030.

As part of this process, the Rottnest Island Authority has been referred under the Environmental Protection Act 1986 to submit a comprehensive Greenhouse Gas emissions Project estimate covering Clearing of 3.47 Ha of Native Woodlands, Construction and subsequent Operation to 2050, including Life Cycle emissions for Materials used.

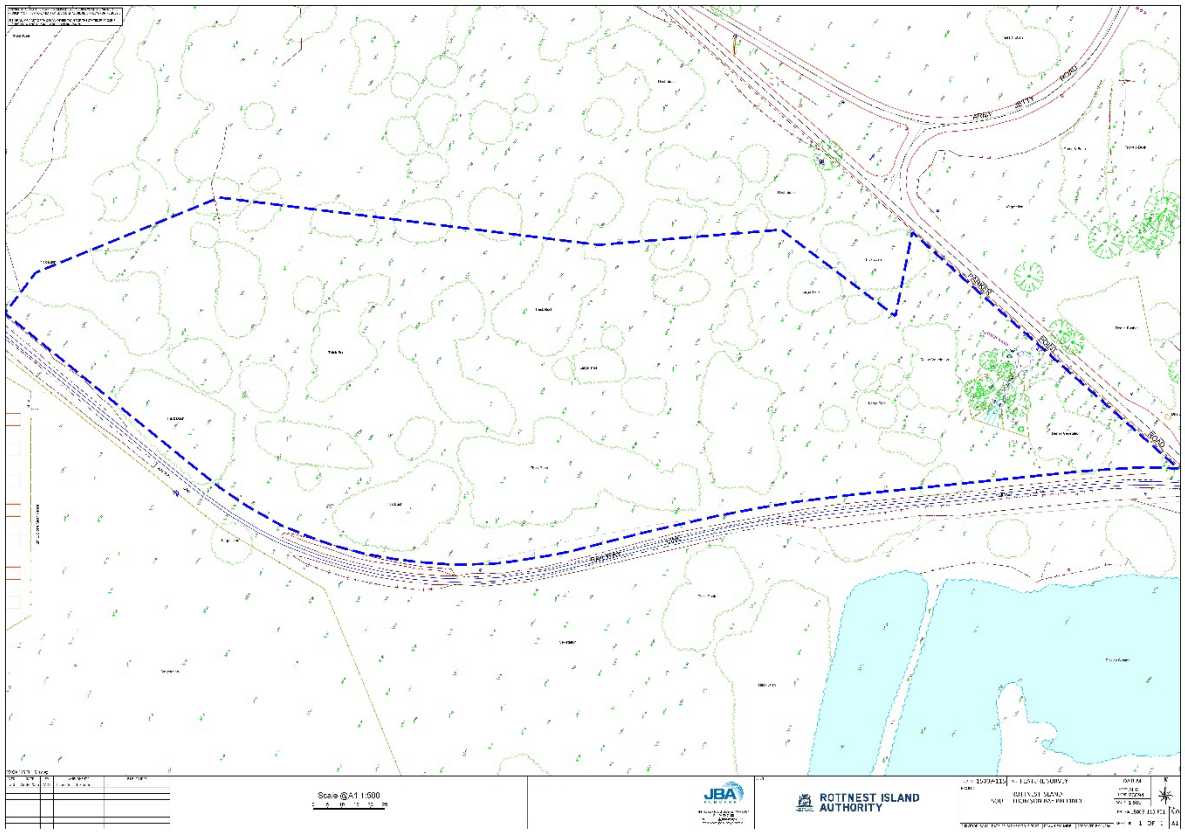

Figure 1: Proposed Wadjemup Workers Accommodation Project

2.2 Footprint Boundary

The Carbon Emissions Assessment boundary for this footprint is shown in Table 1.

Table 1 Activity sources included in report boundary

Source	Location	Scope	Reported	Reason
Lifecycle Materials Aluminium Steel Concrete Wood Glass Glass Wool Copper Wire Plasterboard Compressed Fibre Cement (CFC) Ceramic Vinyl	**Modular Accommodation & Storage Modules** Steel Framed Floors Plywood Floors SHS Steel Wall Columns Steel Roof Framing Corrugated Steel Roof Sheets Plasterboard lining CFC Cladding Aluminium Windows/Louvres Glass Windows/Shower Screens Wood and Aluminium Doors Flyscreens Interior Wall Wood Framing Ceramic Tiles Vinyl Floor Planking Ceramic Benchtops, Sinks, Electrical wiring MDF Skirting Pipework	3	Yes	Major source >10% Data Not Available Benchmark Factor Available
Lifecycle Materials Concrete	**Footpaths** ***Insitu Poured* Concrete**	3	Yes	Major source

Lifecycle Materials Asphalt	**Sealed Access Road** **Hot Mix Asphalt**	3	Yes	Major source
Lifecycle Materials Miscellaneous	**Accommodation and Storage Modules** Appliances Furniture Fixtures Tapware Fibre Cabling Electronics	3	No	Potentially significant source, Data Not Available Covered by 20% Upscale Factor
Operational Emissions Electrical	**Appliances** Lighting Hot water unit Air conditioners Washing machines Clothes Dryers	2	Yes	Significant source >5%
Operational Emissions Water & Wastewater	**Groundwater extraction pumps** **Desalinisation plant** **Membrane Bioreactor WWTP** **Treated wastewater injection bores**	3	Yes	Significant source >5%
Operational Emissions Municipal Solid Waste decomposition	**Landfills** SMRC Regional Resource Centre	3	Yes	Major source
Operational Emissions Municipal Solid Waste transportation	**Garbage Trucks** **Rottnest Barge**	3	Yes	Major source

Operational Emissions Maintenance Energy Usage	**Sealed Access Roads** Paving Repair Painting	1	Yes	Minor source <1% Data Available Major Reporting Category for EPA
Construction Emissions Energy Usage	**Project Cleared Area** Land clearing	1	Yes	Minor source <1% Data Available
Construction Emissions Vegetation Removal	**Project Cleared Area** Carbon Loss From Removed Trees Foregone Sequestration Foregone Debris Buildup Foregone Soil Carbon Change	1	Yes	Minor source <1% Data Available
Construction Emissions Materials Transport	**Accommodation and Storage Modules** Materials To Site Waste From Site	3	Benchmark Data Used	Significant source >5% Data Available
Construction Emissions Energy Usage	**Accommodation and Storage Modules** Building Construction Administration	1	Yes	Major source likely >10% Data Not Available Benchmark Factor Available
Construction Emissions Energy Usage	**Earthworks** Cut To Fill Cut To Spoil Import and Place Filing Top Soil Strip Respread	1	Yes	Significant source >5% Data Available
Construction Emissions Energy Usage	**Sealed Access Road** Road surfacing HMA	1	Yes	Minor source <1% Data Available

Construction Emissions Energy Usage	**Footpaths** Concrete Footpaths	1	Yes	Minor source <1% Data Available
Decommissioning Emissions Energy Usage	**Accommodation and Storage Modules** Demolition Waste Clearing Earthworks	1	No	Minor source >5% data unavailable Not a reportable category for EPA requirements
Decommissioning Emissions Energy Usage	**Accommodation and Storage Modules** Waste Removal	3	No	Minor Scope 3 source data unavailable Not a reportable category for EPA requirements
Tree planting	All	1	No	No significant tree planting to be undertaken.
Upstream emissions consumables	All	3	No	Minor Scope 3 source, data unavailable
Contractor minor consumables	All	3	No	Minor Scope 3 source, data unavailable

All Scope 3 minor emission sources not included in the Reporting boundary are assumed to contribute less than 1% of emissions individually and 5% in aggregate. Given the size of other unreported larger emissions sources, and with comparison with other similarly sized facilities, these emissions are accounted for in a 20% materials emissions upscale calculation.

2.3 Land Use History

The vegetated areas to be cleared for the Wadjemup Workers Accommodation Project on Rottnest Island lies immediately inland from Army Jetty at Bickley Point, bordered by Parker Point Road and Kingstown Road, and adjacent to areas cleared for the Rottnest Airport landing strip, the Rottnest Island Solar Farm, and an ephemeral wetland, Bickley Swamp.

Part of pre-historical Wadjuk Nyungar Country, rising sea levels isolated the island leaving it unpopulated at the time of European arrival. For the first 94 years of colonisation, Rottnest Island served as a penal colony for nearly 4,000 Aboriginal men imprisoned from throughout Western Australia. The project area was located near the infamous Quod prison and was likely cleared for firewood and other uses during that time. In 1906 the military established the nearby Army Jetty, and this juncture was the main reception area for goods and personnel during the periods of internment of German prisoners during World War 1 and later the arrival of military garrisons housed and tented in the area during World War 2. Maps from these eras (Figures 2 & 3) show settlement activity concentrated in the area, a pattern that continues to modern day.

Aerial photographs taken at regular intervals since 1941 (Figures 4,5,6,7,8,9) show the Project Area, initially mostly cleared, gradually revegetating until the present when it is covered with mature Melaleuca Acacia forest typical of Rottnest Island in Excellent condition (Figures 10 & 11).

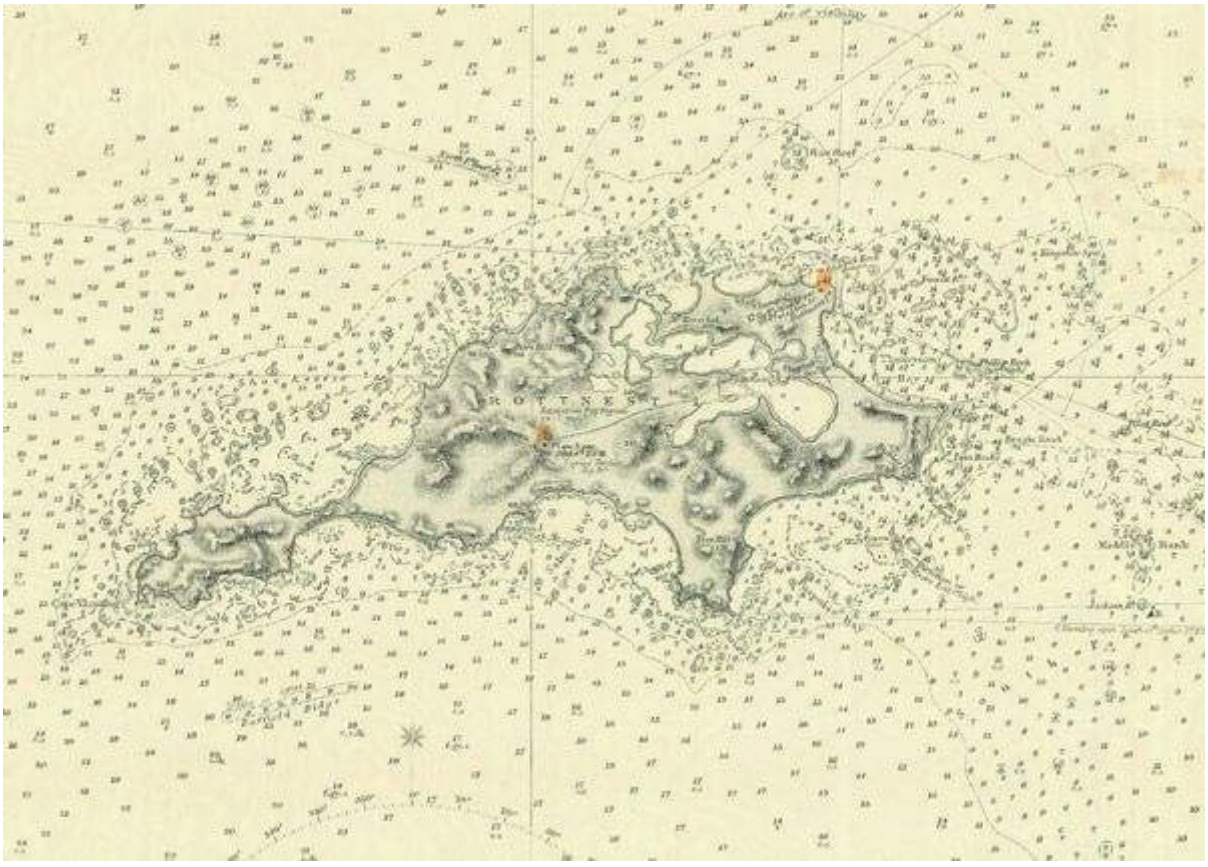

Figure 2 Historical Map Rottnest Island c.1874

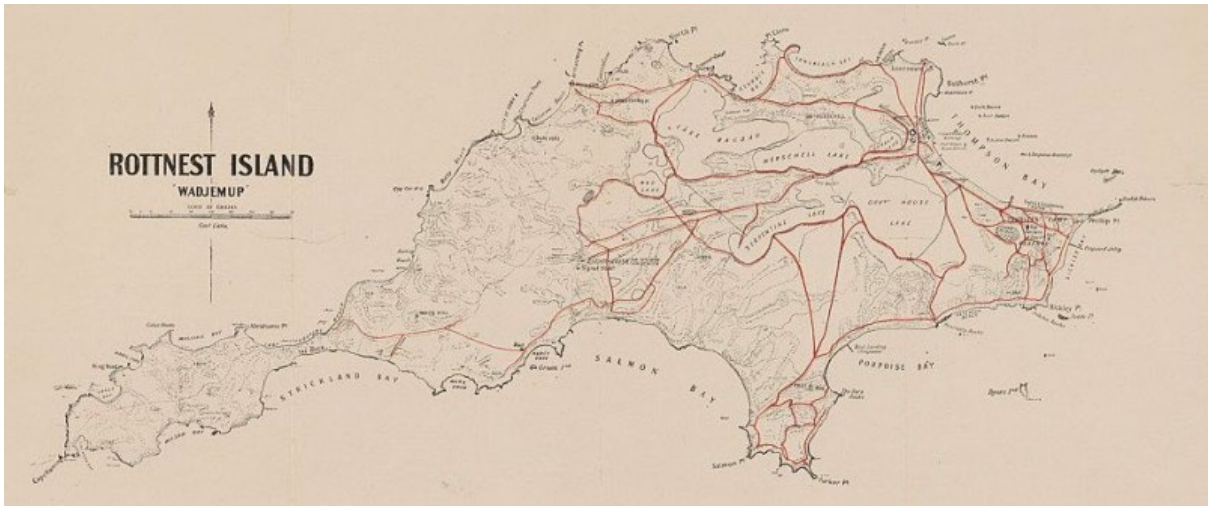

Figure 3: Historical Map Rottnest Island c.1920

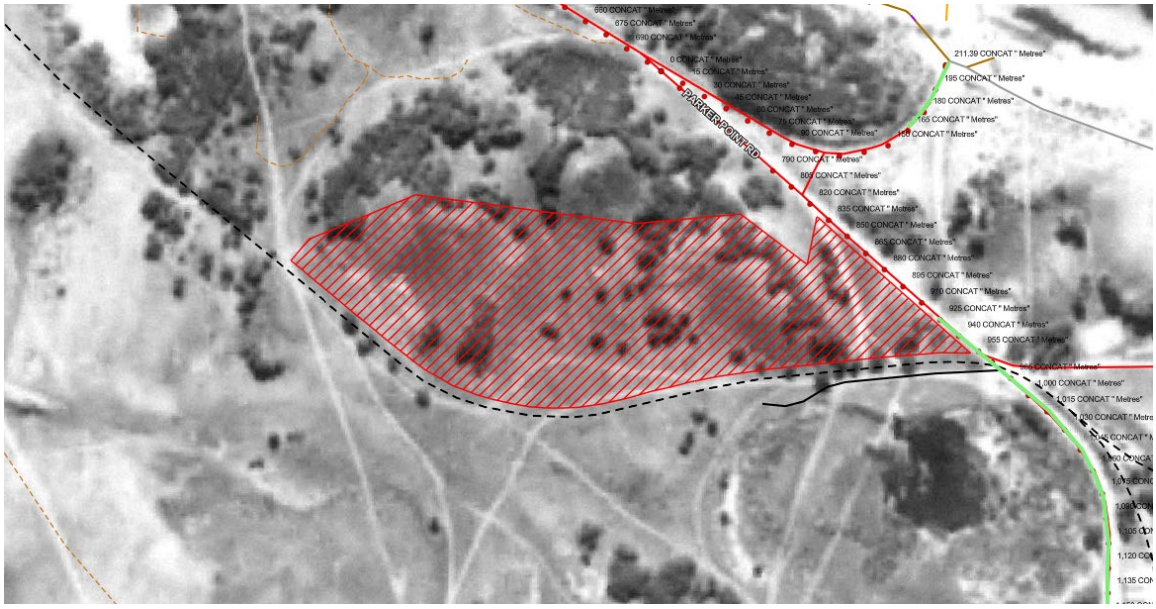

Figure 4 : Landgate Aerial Photograph 1941

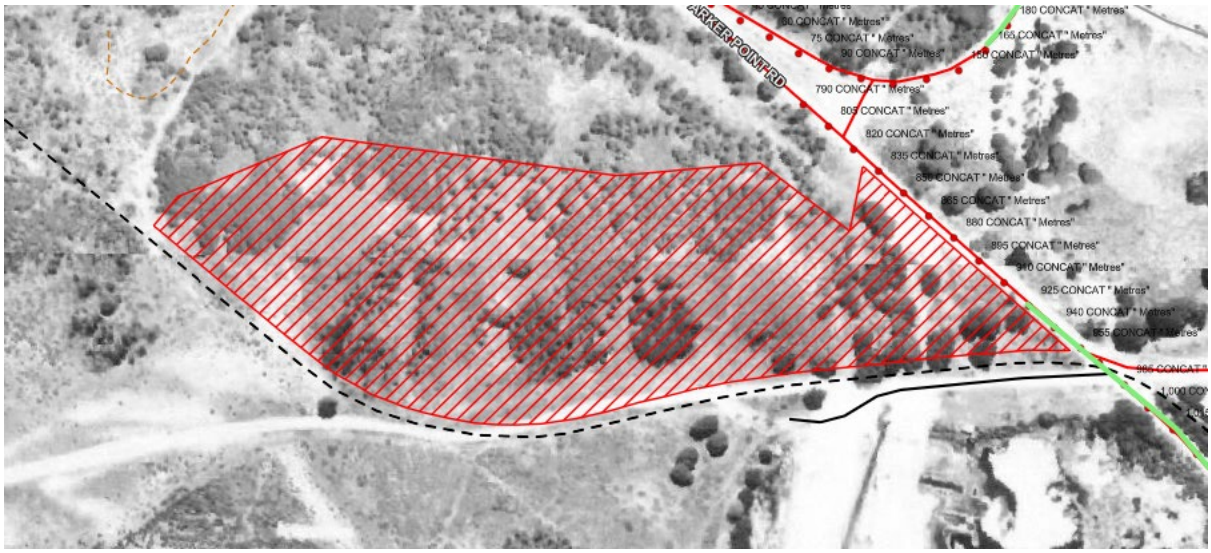

Figure 5: Landgate Aerial Photograph 1966

Figure 6: Landgate Aerial Photograph 1974

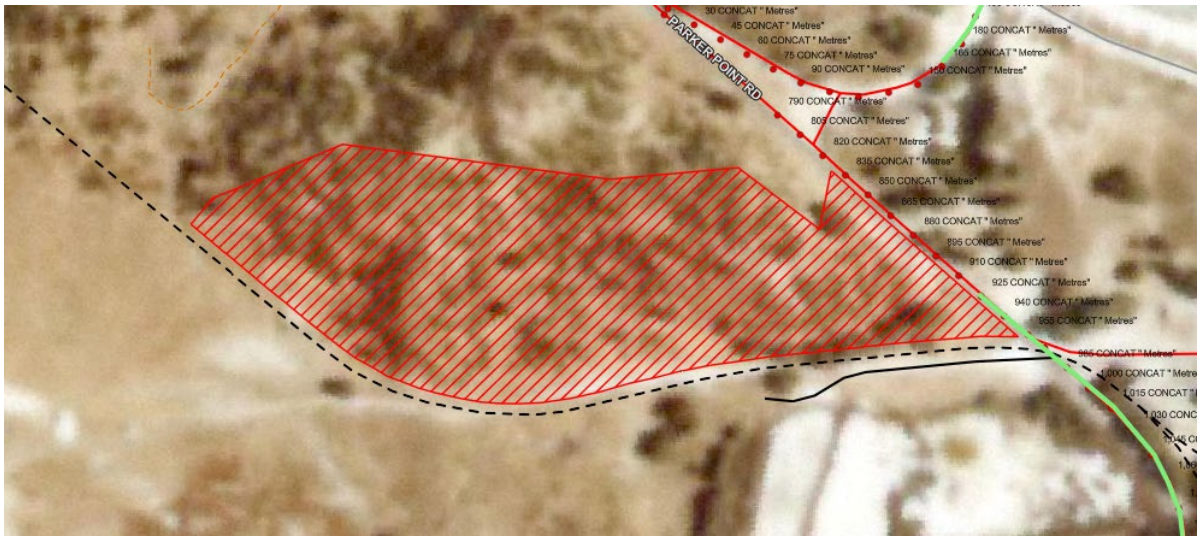

Figure 7: Landgate Aerial Photograph 1984

Figure 8: Landgate Aerial Photograph 1994

Figure 9: Landgate Aerial Photograph 2002

Figure 10: Landgate Aerial Photograph 2024

The Carbon Assessment Area for the Wadjemup Workers Accommodation Project, Is shown in Figure 10. The combined area for which clearing permits have been issued for 3.47 Ha.

Initial conditions for the Project Baseline and Construction scenarios were set by assuming that the Carbon Assessment Area bushland was disturbed historically but has been naturally regenerating since at latest 1941. The Scenario Models assume no significant bushfire, thinning or land clearing events since that time. Based on the aerial photographs and likely land use history this is a reasonable assumption producing a conservative estimate of carbon loss estimates from clearing. Initial conditions and native species present were determined by FullCAM modelling for the carbon estimation area geographic coordinates.

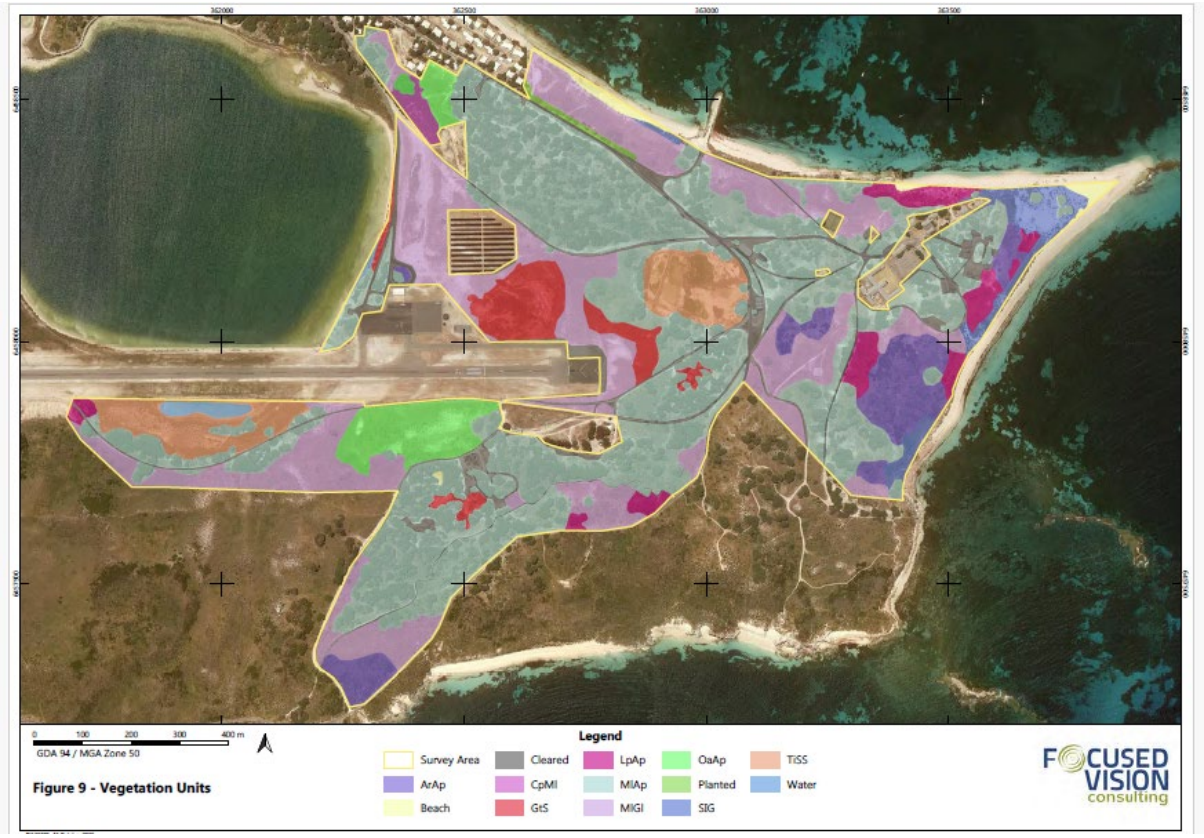

Figure 11: Vegetation Map For The Project Area and Surrounds

A review of the Native Vegetation Association in the area encompassing the CEA (Focused Visions Consulting, 2024) shows a mix of Banksia, Tuart, Melaleuca, Acanthocarpus, Eucalyptus and grasslands while the CEA is dominated by Maleleuca and Acanthocarpus open woodland. The FullCAM defaults for the Maleleuca Acanthocarpus Open Woodland in the area may be derived from an average of various vegetation communities, rather than specific to the CEA.

The baseline scenario assumes that maturation of the natural revegetation of the Carbon Estimation Area will continue over the next 100 years, until 2120, without a significant clearing, bushfire, or thinning event. This is a conservative assumption given increasing bushfire hazard risk expected from climate change.

The project scenario assumes that the Carbon Estimation Area is cleared with vegetation mulched and soil carbon aerated and disturbed. No cleared vegetation will be disposed of in landfill.

Carbon pools included within the methodology include above ground biomass, below ground biomass, and debris. Emissions associated with soil carbon disturbance are estimated but were immaterial in comparison to the total emissions.

The long-term average baseline carbon stock is the average carbon stock per hectare of the allowed carbon pools over the modelling period of the baseline scenario, multiplied by the area of the CEA.

3 Results

3.1 Carbon Emissions Footprint Summary

Total Carbon Emissions for the proposed Wadjemup Workers Accommodation project are estimated at **9,213 tCO2-e**. This includes a 20% upscaled **materials emissions** estimate to account for identified (and unidentified) minor sources or for which data may not have been available (See M6 in Appendix B.2). Emissions Scope refers to the degree of influence an organisation has over emissions associated with their operations.

Scope 1 emissions, as defined by the Western Australian EPA, are construction and maintenance emissions directly under the Rottnest Island Authority operational control and, as such, present opportunities for direct emissions reduction. Overall, ~8% of the Wadjemup Worker Accommodation Project emissions are modelled to be from Scope 1 emissions source during construction.

Scope 2 emissions are indirect emissions associated directly with the Construction and Operation of the Project Assets. The EPA requirement applies the Scope 2 category to direct emissions from the offsite construction of Modular Accommodation components, with Electricity assumed to constitute most of the emissions from that activity. Scope 2 also includes usage of electricity by tenants until 2050. Overall, ~24% of the Wadjemup Worker Accommodation Project emissions are modelled to be from Scope 2 emissions, the majority of these being from tenants' ordinary residential usage. This highlights the relatively small Project Emissions Footprint. Note that operational Scope 2 emissions are modelled to rapidly decrease due to the decarbonisation of the SWIS electricity scheme in line with Western Australian Government policies and infrastructure planning, and in alignment with the Net Zero Science Based Targets Initiative.

Scope 3 emissions occur outside of the organisations operational control, but which are influenced by an organisation's operations. The principle sources of Scope 3 emissions include Upstream embodied emissions in materials used in construction, and Water/Wastewater and MSW taken to landfill from normal residential usage of the accommodation units to 2050. Overall, Scope 3 emissions constitute ~67% of the carbon emissions. These include Materials Lifecycle Emissions (25%) and Residential Water, Wastewater and Waste emissions (40%).

Medium benchmark emissions for Materials and Construction are included based on benchmark factors converting the Gross Floor Area of the proposed design to carbon emissions. These Accommodation benchmark factors are found in Table A6.1 in the Transport NSW Embodied Carbon Measurement for Infrastructure (EMCI) Technical Standard. Carbon emissions matching medium scenario benchmark for Materials Production would be equivalent to ~25% of project emissions. Carbon emissions matching medium scenario benchmark for Construction would be equivalent to ~7% of project emissions.

3.1.1 Net Project Emissions

Total Carbon Emissions modelled for the proposed Wadjemup Workers Accommodation Project are 9,213 tCO2-e.

Total Carbon emissions sequestered from Tree Planting = 0 tCO2-e

Total Carbon emissions offset through carbon credit surrender = 0 tCO2-e

Total Net GHG emissions from MCB operations = 9,213 tCO2-e

3.2 Offset Cost

Assuming all emissions are offset at the Current Market Spot Price for Australian Carbon Credit Units (ACCU) of $34.10 AUD/tCO2-e, the total price to offset all project emissions is currently ~$314,163 AUD.

4 References

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5 APPENDIX A Methodologies

5.1 Emissions from Land Clearing

Estimation of emissions from Land Clearing have been undertaken with reference to the Carbon Credits (Carbon Farming Initiative – Avoided Clearing of Native Regrowth) Methodology Determination 2015 as Amended.

This methodology requires a comparison of a baseline and project scenario using the Full Carbon Accounting Model or FullCAM (2020 version). FullCAM is a model developed to estimate Greenhouse Gas emissions and sequestration from land use change for Australia's National Greenhouse Gas Accounts. The model integrates spatial data on land cover change, land use management, climate, plant productivity, and soil carbon over time. Defaults for the FullCAM model are downloaded to match the coordinate position of the property. Simulations for baseline and project scenarios are required to be over a 100-year period modelling period in accordance with the Methodology.

Equation 1 – Long-term average baseline carbon stock

$$C_{B,i} = \frac{\sum_{k=1}^{1200}(C_{BD,i,k} + C_{BT,i,k}) \times S_i}{1200}$$

Where

CB,i = long-term average baseline carbon stock (in tonnes C) for the carbon estimation area.

CBD,i,k = C mass in debris pool (in tonnes C per hectare) for the carbon estimation area in the kth month since the modelling start date—from FullCAM.

CBT,i,k = C mass of trees (in tonnes C per hectare) for the carbon estimation area in the kth month since the modelling start date—from FullCAM.

Si =the area (in hectares) of the carbon estimation area.

The carbon stock for the project scenario is the carbon pool per hectare at the end of the reporting period (year) multiplied by the surface area of the CEA. The reporting period according to the S38 requirement is on an annual basis.

Equation 2 – Carbon stock for the CEA at the end of each reporting period

$$C_i = \left(C_{D,i} + C_{T,i}\right) \times S_i$$

Where

Ci= C mass of biomass on-site (in tonnes C) for the carbon estimation area in the last month of the reporting period.

CD,i = C mass in debris pools (in tonnes C per hectare) for the carbon estimation area in the last month of the reporting period—from FullCAM.

CT,i = C mass of trees (in tonnes C per hectare) for the carbon estimation area in the last month of the reporting period—from FullCAM.

Si = the area (in hectares) of the carbon estimation area.

The annual Scope 1 carbon loss for the CEA is the difference between the carbon stock for the project scenario and the long-term average baseline carbon stock.

Equation 3 - Scope 1 carbon loss from CEA

$$\Delta C_i = C_i - C_{B,i}$$

Where

ΔCi = change in C mass onsite (in tonnes C) at end of first reporting period.

Ci= C mass of biomass on-site (in tonnes C) for the carbon estimation area in the last month of the reporting period—from Equation 2.

CB,i =long-term average baseline carbon stock (in tonnes C) for the carbon estimation area—from Equation 1.

Equation 4 - Scope 1 CO2-e emissions

$$A = \Delta C_P \times \frac{44}{12}$$

Where

A = project net emissions (in tonnes CO2-e) for the reporting period.

ΔCP = carbon stock change onsite (in tonnes C) in the project area at the end of the reporting period.

5.2 Sequestration From Revegetation

Only revegetation from replanting of Trees and Shrubs can be modelled within FullCAM, and sequestration from grasses, ground covers and batten revegetation would result in minor sequestration.

5.3 Emission from Operation of Land Clearing Equipment

The majority of other emissions from land clearing, earthworks, and construction on the site will be from the combustion of diesel in equipment and delivery of materials to site.

Fuel usage is estimated using standard factors from the NSW Greenhouse Gas Assessment Workbook for Road Projects (Transport Authorities Greenhouse Group (TAGG) 2013)

Equation 5 – Estimation of Diesel From Land Clearing

$$Q_z = \sum_{i=1}^{N_i} (A_{Zi} \ x \ F_{ci})$$

Where:

Qz = Quantity of diesel Q from project Zone z (kL)

Azi = Area of undegraded land cleared (A) from zone Z from plot i

Fc = Liquid fuel combustion from clearing and grubbing of areas with vegetation Class 3.(Table 5.6 Vegetation Removal)

In the absence of plot scale information, the vegetation Class 3 factor (1.6 kL/Ha) was selected as the Class 3 category assumes 100 - 150 (t dry matter/ha) vegetation in the plot and this range included the FullCAM estimate for dry mater at the reference coordinates of all project zones. This factor assumes vegetation removal will be conducted using conventional plant (i.e. graders and dozers).

Emission sources from operation of earthworks equipment

Equation 6 – Estimation of Diesel From Cut and Fill

$$Q_c = \sum_{i=1}^{N_i} V_M \ x \ F_c$$

Where:

Qc = Quantity of diesel Q from Cut and Fill category c (kL)

Vm = Volume of material moved (m3)

Fc = Liquid fuel combustion from excavation and transport during cut and fill operations.(Table 5.6 Earthworks) (kL/ m3)

Cut to Spoil (0.004 kL/ m3) used for limestone boulder removal

Cut to Fill (0.001 kL/ m3) project is material neutral so all cut material used in fill or stockpiled.

Import to Fill (0.0035 kL/ m3) Not applied as project is material neutral.

5.4 Emissions from Construction and Equipment

Equation 7– Estimation of Diesel From Construction of Drainage

$$Q_t = \sum_{i=1}^{N_i} L_t \ x \ F_t$$

Where:

Qt = Quantity of diesel Q from construction of drainage of type t (kL)

Lt = Length of drainage of type t (m)

Fc = Liquid fuel combustion from excavation and transport during construction of drainage. (Table 5.10 Drainage) (kL/ m)

Culverts -<450 RCP (0.035 kL/ m)

Culverts -450 to 750 RCP (0.045 kL/ m)

Culverts -750 to 1200 RCP (0.095 kL/ m)

Assumes trench width is approximately 600mm wider than pipe diameter, cover = 1.0m and includes all imported bedding, surround and backfill materials.

Kerbing – Semi-mountable (0.03kL/m) Unreinforced

Equation 8– Estimation of Diesel From Construction of Pavements

$$Q_t = \sum_{i=1}^{N_i} A_t \ x \ F_t$$

Where:

Qt = Quantity of diesel Q from construction of pavement of type t (kL)

At = Area of pavement of type t (m2)

Fc = Liquid fuel combustion from construction of paved areas.(Table 5.8 Pavements) (kL/ m2)

Full depth asphalt (0.0017 kL/ m2) {175mm of Asphalt, 200mm of 4% cement treated aggregate, 150mm of 2% cement treated aggregate, 150mm of aggregate basecourse.5% bitumen content}

Warm asphalt (0.00169 kL/ m2) {195mm of Asphalt, 175mm of 4% cement treated aggregate and150mm of aggregate basecourse }

Deep strength asphalt (0.00215 kL/ m2) – { 175mm of Asphalt, 200mm of 4% cement treated aggregate, 150mm of 2% cement treated aggregate, 150mm of aggregate basecourse.5% bitumen content }

Sealing - Prime (0.00012 kL/ m2) {Based on 1.2 litres/m2 Includes diesel rural multiplication factor of 6}

5.5 Emissions from Combustion of Diesel

Estimates of Scope1 Greenhouse Gas Emissions From Diesel

Scope 1 Greenhouse Gas emissions for use of diesel equipment combusted in the project is estimated according to the following equation:

Equation 9 - Emissions of GHG from combustion of Diesel

$$E_T = \sum_{i=1}^{N_i} \frac{Q_{i,p}}{1000} \ x \ J_p \ x \ \sum_{s=1}^{N_s} F_s$$

Where

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

QD = Quantity of fuel type p (Diesel) combusted by engine group I (L)

Jp = Energy content of fuel (GJ/kL) – Source: NGER (Measurement) Determination 2008 (Schedule 1) (38.6 GJ/kL).

Fs = Emission factor for GHG emitted substance s (tCO2-e/GJ) – Source: NGER (Measurement) Determination 2008 (Schedule 1).

FCO2 = Emission factor for CO2 from combustion of diesel (69.9 tCO2-e/GJ)

FCH4 = Emission factor for methane from combustion of diesel (0.1 tCO2-e/GJ)

FN2O = Emission factor for nitrous oxide from combustion of diesel (0.2 tCO2-e/GJ)

Emissions factors and equations from National Greenhouse Accounts Factors Handbook 2024.

5.6 Scope 3 Emissions From Waste to Landfill

Equation 10 - Emissions From Waste to Landfill

$$E_T = \sum_{i=1}^{N_i} Q_{i,w} \; x \; F_w$$

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

Q = the quantity of waste sent to landfill in delivery I of type w (Municipal solid waste or commercial/construction waste)

Fw =the scope 3 emission factor for waste type a (Municipal Solid Waste = 1.6)

The source of data for these calculations is waste deliver invoices from suppliers.

5.7 Scope 3 Emissions from Water Usage and Wastewater Discharge

Equation 11 - Emissions from Water Usage and Wastewater Discharge

$$E_T = \sum_{i=1}^{N_i} Q_W \; x \left\{ \frac{\left[\frac{F_{ETCP}}{1000} \right]}{Q_{AWS}} \right\}$$

Where:

ET = Total global warming potential from emissions of GHG (tCO2-e)

QW = Quantity of water supplied (kL)

FETCP = Emission factor for GHG Emissions from water provision per 1,000 properties (tCO2-e / 1000 properties) taken from Bureau of Met. National Performance Report 2020-2021: Urban Water Utilities Table 2.6 Perth Integrated Water Supply Scheme – 0.695

QAWS = Average quantity of water supplied per 1,000 properties (kL / property) taken from Bureau of Meteorology National Performance Report 2020-21: Urban Water Utilities Table 2.3 Perth - 227.

5.8 Scope 2 Electricity Emissions

Electricity use from the grid is associated with emissions offsite (Scope 2). The Rottnest Island Authority Emission Factor as of 05/12/2024 and has been used in this calculation.

Equation 11 - Emissions of GHG from purchased electricity from the SWIS Grid

Electricity use from the grid is associated with emissions offsite (Scope 2) and has been calculated using the method in the National Greenhouse Accounts Factors (2024).

$$E_T = \frac{\sum_{i=1}^{N_i} Q_{i,p} \ x \ F_s}{1000}$$

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

Q = the quantity of electricity purchased (kWh).

Fs = the scope 2 emission factor for the Rottnest Island (0.497 kg.CO2-e/kWh) scaled – Source: RIA GHG Emissions Inventory as of 05122024

5.9 Minor Source Emissions Uplift as a Percentage

Small sources with a smaller proportion of total emissions of 1% per instance of a source and 5% in aggregate can be considered as incidental emission sources under NGERS. While specific incidental Scope 1 emissions cannot be easily identified at this stage of the land development, they could include combustion of lubricants, small vehicle traffic, leakage of vehicle and office air conditioner refrigerants and hedgers and trimmers.

5.10 Lifecycle Carbon Emissions From Material Usage

$$E_T = \sum_{i=1}^{N_i} \frac{Q_{i,p} \ x \ F_s}{1000}$$

Where

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

Qi = Quantity of material type p of products used in construction.

Fs = Materials lifecycle carbon emission factors (kgCO2-e/tonne) – Source: Infrastructure Sustainability Materials Calculator 2022-23. Specific factor values described in Appendix B.

5.11 Scope 2 Electricity Emissions

Electricity use from the grid is associated with emissions offsite (Scope 2) and has been calculated using the method in the National Greenhouse Accounts Factors (2024).

$$E_T = \frac{\sum_{i=1}^{N_i} Q_{i,p} \ x \ F_s}{1000}$$

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

Q = the quantity of electricity purchased (kWh).

Fs =the scope 2 emission factor for the Rottnest Island Grid 2024 (0.497 kg.CO2-e/kWh) – Source: RIA GHG Emissions Inventory as of 05122024

Electricity usage (kWh) from non-renewable sources is determined by multiplying the expected electricity demand from installed lighting by the percentage of electricity from fossil fuels expected on the grid in future years assuming Commonwealth Interim Targets to 2030 and thereafter following the trajectory for aligning with Net Zero Science Based Targets.

5.12 Scope 3 Electricity Emissions

Electricity use from transmission line loss in the grid (Scope 3) and has been calculated using the method in the National Greenhouse Accounts Factors (2022).

$$E_T = \frac{\sum_{i=1}^{N_i} Q_{i,p} \ x \ F_s}{1000}$$

ET = Global Warming Potential for emissions of greenhouse gases (tCO2-e)

Q = the quantity of electricity purchased (kWh).

Fs =the scope 3 emission factor for the Western Australian grid 2024 (0.06 kg.CO2-e/kWh) – Source: National Greenhouse Gas Account (NGA) Factors (2024)

Electricity usage (kWh) from non-renewable sources is determined by multiplying the expected electricity demand from installed lighting by the percentage of electricity from fossil fuels expected on the grid in future years assuming Commonwealth Interim Targets to 2030 and thereafter following the trajectory for aligning with Net Zero Science Based Targets.

6 APPENDIX B GREENHOUSE GAS EMISSIONS MODEL

APPENDIX B.1 - SUMMARY OF GHG INVENTORY FOR PLANNED WORKERS ACCOMMODATION

PLEIADES

COMPANY: **Rottnest Island Authority**
FACILITY: **Development of Workers Accommodation**
PERIOD: **2025-2030**
REASON: **EPA Referral**

CALCULATION SHEET
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ITEM N°	ITEM	VALUE	UNITS	COMMENT
	4 - Total Greenhouse Gas Emissions			
	CONSTRUCTION ELEMENTS			
4a	**- Scope 1 Civil Works**	**771**	**t CO2-e**	***= 1j+1t+1w+1x+1ab+1ad+1ae***
4b	**- Scope 2 Module Units**	**604**	**t CO2-e**	***= 1u***
4c	**- Scope 3 Material Life Cycle Emissions**	**2,482**	**t CO2-e**	***= 3a+3b+3c+3d+3e***
	- OPERATION ELEMENTS (30 years)			
4d	**- Scope 1 Maintenance**	**2**	**t CO2-e**	***= 2d***
4e	**- Scope 2 Electricity Usage**	**1,608**	**t CO2-e**	***= 2b***
4f	**- Scope 3 Waste and Waste Water**	**3,745**	**t CO2-e**	***= 2f+2h+2i***
4g	**- TOTAL PROJECT GHG FOOTPRINT**	**9,213**	**t CO2-e**	***= 4a + 4b + 4c + 4d + 4e + 4f***
	3 - Emissions of GHGs			
	- CONSTANTS			
3a	- Energy Content Factor (Scope 1 Diesel)	38.600	GJ/kL	*From Schedule 1 Part 3 Item 40 - NGER Measurement Determination*
3b	- Emission Factor: CO2 (Scope 1 Diesel)	69.900	kg CO2-e/GJ	*From Schedule 1 Part 3 Item 40 - NGER Measurement Determination*
3c	- Emission Factor: CH4 (Scope 1 Diesel)	0.1000	kg CO2-e/GJ	*From Schedule 1 Part 3 Item 40 - NGER Measurement Determination*
3d	- Emission Factor: N2O (Scope 1 Diesel)	0.2000	kg CO2-e/GJ	*From Schedule 1 Part 3 Item 40 - NGER Measurement Determination*
3e	- Emission Factor: Total CO2e (Diesel Scope 3)	3.6000	kg CO2-e/GJ	*NGA Factor 2024 Table 45 Diesel Oil*
3f	- Emission Factor: Total CO2e (Electricity Scope 2)	0.4970	kg CO2-e/kWh	*230405 RIA GHG emissions inventory as of 05122024*
3g	- Emission Factor: Total CO2e (Electricity Scope 3)	0.0600	kg CO2-e/kWh	*NGA Factors 2024 Table 1 WA SWIS Grid*
3h	- Emission Factor: Total CO2e (Water Scope 3)	0.0025	tCO2/kL	*BOM Water Performance Indicators 2020 Part A - Tables 2.3 and 2.6*
3i	- Emission Factor: Total CO2e (MSW to Landfill)	1.6000	tCO2e/tonne	*NGA Factor 2024 Table 16 : Waste emission factors for total waste disposed to landfill by broad waste stream category*
	- Formula			***ECO2e,j = Qi x ECi x (EFi,CO2 + Efi,CH4 + Efi,N20) / 1000***
	1 - Construction GHG Emissions			
1a	- Cut to Fill - Diesel Combustion	2702.0	GJ	*= C1.013 x 3a*
1b	- Cut to Fill - GHG Emissions	199.4	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1a] / 1000*
1c	- Cut to Spoil - Diesel Combustion	0.0	GJ	*= C1.014 x 3a*
1d	- Cut to Spoil - GHG Emission	0.0	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1c] / 1000*
1e	- Import and Place Filling - Diesel Combustion	0.0	GJ	*= C1.015 x 3a*
1f	- Import and Place Filling -GHG Emission	0.0	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1e] / 1000*
1g	- Top Soil Strip Respread - Diesel Combustion	0.0	GJ	*= C1.016 x 3a*
1h	- Top Soil Strip Respread - GHG Emission	0.0	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1g] / 1000*
1i	**- Earthworks - Diesel**	**2,702**	**GJ**	***= 1a + 1c + 1e + 1g***
1j	**- Earthworks - GHG Emission**	**199**	**t CO2-e**	***= 1b + 1d + 1f + 1h***
1k	- Pavements - Diesel Combustion	111	GJ	*= C2.023 x 3a*
1l	- Pavements - GHG Emission	8	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1k] / 1000*
1m	- Road Structures - Diesel Combustion	-	GJ	*= C5.003 x 3a*
1n	- Road Structures - GHG Emission	-	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1m] / 1000*
1o	- Drainage - Diesel Combustion	-	GJ	*= C2.043 x 3a*
1p	- Drainage -GHG Emission	-	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1o] / 1000*
1q	- Road Furniture - Diesel Combustion	-	GJ	*= C2.063 x 3a*
1r	- Road Furniture - GHG Emission	-	t CO2-e	*=[(3b + 3c + 3d + 3e) x 1q] / 1000*
1s	**- Construction - Diesel Combustion**	**111**	**GJ**	***= 1k + 1m + 1o + 1q***
1t	**- Construction - GHG Emission**	**8**	**t CO2-e**	***= 1l + 1n + 1p + 1r***
1u	**- Modular Units Construction Benchmark Emissions (Medium)**	**604.1**	**t CO2-e**	***= C5.008***
1v	**- Clearing - Diesel Combustion**	**214.3**	**GJ**	*= C3.003 x 3a*
1w	**- Clearing - GHG Emission**	**15.8**	**t CO2-e**	*=[(3b + 3c + 3d + 3e) x 1v] / 1000*
1x	**- Vegetation Loss**	**473**	**t CO2-e**	***= 44.01 / 12.0107 x C3.012***
1y	**- Revegetation**	**0**	**t CO2-e**	
1aa	**- Admin - Diesel**	**1,011**	**GJ**	*= C4.007 x 3a*
1ab	**- Admin - Diesel**	**75**	**t CO2-e**	*=[(3b + 3c + 3d + 3e) x 1aa] / 1000*
1ac	**- Waste Transport - Diesel**	**0**	**GJ**	*= C6.011 x 3a*
1ad	**- Waste Transport - Diesel**	**0.0**	**t CO2-e**	*=[(3b + 3c + 3d + 3e) x 1ac] / 1000*
1ae	**- Waste Transport - Water Transport**	**0.1**	**t CO2-e**	*= C6.013*
	2 - Operational GHG Emissions (Over 30 years)			
2a	**- Operation - Electricity usage**	**10,392**	**GJ**	***= 0.277778 x D1.077***
2b	**- Operation - GHG Emission**	**1,608**	**t CO2-e**	***=(3f + 3g) x 2a***
2c	**- Maintenance - Diesel Combustion**	**25**	**GJ**	*= D2.017 x 3a*
2d	**- Maintenance - GHG Emission**	**2**	**t CO2-e**	*=[(3b + 3c + 3d + 3e) x 2c] / 1000*
2e	**- Water Usage**	**1,162**	**ML**	*= D3.010 / 1000*
2f	**- Water - GHG Emission**	**217**	**t CO2-e**	*= D3.011 + D3.012*
2g	**- Municipal Solid Waste to Landfill**	**2,204**	**Tonne**	*= D3.005 x D3.008 x D3.007*
2h	**- MSW - GHG Emission**	**3,526**	**t CO2-e**	*= [3i x 2g]*
2i	**- MSW - Transport GHG Emission**	**2.893**	**t CO2-e**	*= [C6.014 x 2g]*
	3 - Materials Lifecycle Emissions			
3a	**- Concrete works LCA emissions**	**108**	**t CO2-e**	*= M6.001*
3b	**- Asphalt works LCA emissions**	**56**	**t CO2-e**	*= M6.002*
3c	**- Material transfers LCA emissions**	**10**	**t CO2-e**	*= M6.005*
3d	**- Upscale Materials LCA Emissions**	**35**	**t CO2-e**	*= M6.006*
3e	**- Accommodation Modules - Benchmark Emissions (Medium)**	**2,273**	**t CO2-e**	*= M7.006*

APPENDIX B.2 - Project Materials Life Cycle Emissons

PLEIADES

COMPANY: **Rottnest Island Authority**
FACILITY: **Development of Workers Accommodation**
PERIOD: **2025-2030**
REASON: **EPA Referral**

CALCULATION SHEET
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Prepared by: Sam Nelson - Pleiades

ITEM N°	ITEM	VALUE	UNITS	COMMENT
5	**Total Life Cycle Carbon Emissions**			
5a	**- Total Materials Lifecycle Emissions**	**2,482**	**tCO2-e**	***= M6.008 + M7.006*** ***Inclusive of Materials Transport***
5b	**- Materials Transport Lifecycle Emissions**	**10**	**tCO2-e**	***= M5.009***
M1	**Concrete Works LCA Model**			
	- LCA Factors			
M1.001	- Insitu Concrete - 20 mpa	0.308	tCO2e/m3	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M1.002	**- Insitu Concrete - 32 mpa**	**0.386**	**tCO2e/m3**	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M1.003	- Insitu Concrete - 40 mpa S Class	0.4670	tCO2e/m3	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M1.004	- Insitu Concrete - 50 mpa	0.5780	tCO2e/m3	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M1.005	- Precast Concrete - 40mpa	0.1950	tCO2e/tonne	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
	- Material Usage			
M1.006	- Concrete Footpaths	3725.000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
M1.007	- Thickness of concrete	0.075	m	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
M1.008	- Density of Concrete	2.30	tonne/m3	*From Table XI.4 – Coarse Aggregate Testing - Guide to Concrete Construction (CCAA)*
M1.009	- Insitu Concrete - 20 mpa	-	m3	
M1.010	**- Insitu Concrete - 32 mpa**	**279**	**m3**	*= M1.006 x M1.007*
M1.011	- Insitu Concrete - 40 mpa S Class	-	m3	
M1.012	- Insitu Concrete - 50 mpa	-	m3	
M1.013	- Concrete Block Work - Hollow Core Blocks - Large	-	m2	
M1.014	- Concrete Block Work - Hollow Core Blocks - Medium	-	m2	
M1.015	- Concrete Block Work - Hollow Core Blocks - Large	-	tonne	
M1.016	- Concrete Block Work - Hollow Core Blocks - Medium	-	tonne	
	- Formula - Greenhouse Gas Emissions			***Qd= Vm x Fd***
M1.017	- Insitu Concrete - 20 mpa	-	tCO2e	*= M1.009 x M1.001*
M1.018	**- Insitu Concrete - 32 mpa**	**108**	**tCO2e**	*= M1.010 x M1.002*
M1.019	- Insitu Concrete - 40 mpa S Class	-	tCO2e	*= M1.011 x M1.003*
M1.020	- Insitu Concrete - 50 mpa	-	tCO2e	*= M1.012 x M1.004*
M1.021	- Concrete Block Work - Hollow Core Blocks - Large	-	tCO2e	*= M1.015 x M1.005*
M1.022	- Concrete Block Work - Hollow Core Blocks - Medium	-	tCO2e	*= M1.016 x M1.005*
M1.023	**- TOTAL Emissions**	**108**	**tCO2e**	***= M1.017 + M1.018 + M1.019 + M1.020 + M1.021 + M1.022***
M2	**Asphalt Works LCA Model**			
	- Energy Factors - Pavements			
M2.001	**- Hot mix asphalt - 5% virgin bitumen (10% RAP)**	**0.1360**	**tCO2e/m3**	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
	- Material Usage			
M2.002	- C10 Asphalt - Full depth asphalt	1480.000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
M2.003	- Thickness of asphalt	0.28	m	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
M2.004	- Density of Asphalt	2.40	tonne/m3	*From Iowa Department of Transportation - Hot Mix Asphalt Compacted Properties*
M2.005	**- Hot mix asphalt - 5% virgin bitumen (10% RAP)**	**414**	**m3**	*= M2.002 x M2.003*
	- Formula			***Qd= Ap x Fd***
M2.006	**- Hot mix asphalt - 5% virgin bitumen (10% RAP)**	**56**	**tCO2e**	*= M2.005 x M2.001*
M2.007	**- TOTAL Emissions**	**56**	**tCO2e**	***= M2.006***
M3	**Steel Materials LCA Model**			
	- Energy Factors - Pavements			
M3.001	- Infrabuild Steel Reinforcing Bar and Wire	1980	kgCO2e/t	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M3.002	- InfraBuild Steel, Low relaxation wire	1980	kgCO2e/t	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M3.003	- BlueScope Welded Beams and Columns	2890	kgCO2e/t	*BlueScope Welded Beams and Columns 2020 (EPD559)*
M3.004	- Steel, hot rolled metal coated - Australian	2750	kgCO2e/t	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
M3.005	- BlueScope Hot Rolled Coil – Low Carbon Steel	2330	kgCO2e/t	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
	- Material usage			
M3.006	- Steel Rebar Reinforcement		tonnes	
M3.007	- Steel Structural lightweight roof framing		tonnes	
M3.008	- Mild steel balustrade		m	
M3.009	- Mild steel handrail		m	
M3.010	- Mild steel balustrade		tonnes	
M3.011	- Mild steel handrail		tonnes	
	- Formula			***Qd= Ap x Fd***
M3.012	- Steel Rebar Reinforcement	0	tCO2e	*= M3.012 x M3.001*
M3.013	- Steel Structural lightweight roof framing	0	tCO2e	*= M3.007 x M3.004*
M3.014	- Mild steel balustrade	0	tCO2e	*= M3.010 x M3.005*
M3.015	- Mild steel handrail	0	tCO2e	*= M3.015 x M3.004*
M3.016	**- TOTAL Emissions**	-	tCO2e	***= M3.012 + M3.013 + + M3.014 + M3.015***
M4	**Aluminium Materials LCA Model**			
M4.001	- Aluminium Materials LCA Model	20000	kgCO2e/t	*ISC Infrastructure Sustainablity Materials Calculator 2023-03*
	- Aluminium Materials Used			
M4.002	- Facade Perforated aluminium panel		m2	
M4.003	- Facade vertical aluminium box section fins; 250x50		m2	
M4.004	- Facade Perforated aluminium panel		tonnes	*Converted based on indicative kg/m2 specification*
M4.005	- Facade vertical aluminium box section fins; 250x50		tonnes	*Converted based on indicative kg/m2 specification*
	- Formula			***Qd= Vm x Fd***
M4.043	- Facade Perforated aluminium panel	0	tCO2e	*= M4.004 x M4.001*
M4.044	- Facade vertical aluminium box section fins; 250x50	0	tCO2e	*= M4.005 x M4.001*
M4.045	**- TOTAL Emissions**	-	tCO2e	***= M4.043 + M4.044***

M5		**Material Transfers LCA Model**			
		- Model Drivers			
	M5.001	- Total numbers of rooms in project	168	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	M5.002	- Total mass of concrete (Concrete Footpaths)	643	tonnes	*= M1.010 x M1.008*
	M5.003	- Total mass of asphalt (Pavements)	995	tonnes	*= M2.005 x M2.004*
	M5.004	- Total transfers required with barge at capacity	18	Count	*= M5.002 + M5.003 / 90*
		- Energy Factors			
	M5.005	- Container Barges Small (90TEU)	0.0313	kgCO2-e/tonne.km	*From Table 10 ECTA Guidelines for Measuring and Managing CO2 Emission from Freight Transport Operations*
		- Material movements			
	M5.006	- Transport capacity of barge	90.0000	Tonne	*Spinifex Barge Datasheet*
	M5.007	- Round Trip Rottnest Port to Freo Port	40.0000	km	*By Sea from Rottnest Island Main Port to Fremantle Ferry Terminal*
	M5.008	- Transport Materials Average Weight	45.0000	Tonne	*= M5.006 / 2*
		- Formula			***Qd= Ct x Ap x Um x Fd / 1000***
	M5.009	**- TOTAL Emissions**	**10**	tCO2e	***= (M5.001 + M5.004) x M5.008 x M5.007 x M5.005 / 1000***
M6		**- Materials LCA Model Summary**			
	M6.001	- Concrete works LCA emissions	108	tCO2e	*M1.023*
	M6.002	- Asphalt works LCA emissions	56	tCO2e	*M2.007*
	M6.003	- Steel LCA emissions	0	tCO2e	*M3.016*
	M6.004	- Aluminium LCA emissions	0	tCO2e	*M4.045*
	M6.005	- Material transfers LCA emissions	10	tCO2e	*M5.009*
	M6.006	- Upscale Materials LCA Emissions	35	tCO2e	*80% Completion upscaling per NSW Embodied Carbon Measurement Due to exclusion of minor materials such as duct work, asphalt, etc..*
	M6.007	- Total without upscaling factor	175	tCO2e	*= M6.001 + M6.003 + M6.004*
	M6.008	**- TOTAL MATERIALS LCA EMISSIONS**	**210**	**tCO2e**	***= M6.007 + M6.006***
M7		**Benchmark Estimates For Accommodation Buildings**			
		- Energy Factors			
	M7.001	- Materials Embodied Emission Intensity (Low)	289.0	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
	M7.002	- Materials Embodied Emission Intensity (Medium)	386.0	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
	M7.003	- Materials Embodied Emission Intensity (High)	482.0	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
		- Benchmark Drivers			
		- Modular Accommodation Units [149 no]	5810	m2GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
		- Modular Stores	78	m2GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	M7.004	- Gross Floor Area of Dwellings	5888	m2 GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
		- Benchmark Emissions			***Qd= Tm x Fd / 1000***
	M7.005	- Materials Embodied Emission Intensity (Low)	1,702	tCO2e	*= M7.005 x M7.001*
	M7.006	**- Materials Embodied Emission Intensity (Medium)**	**2,273**	**tCO2e**	*= M7.006 x M7.002*
	M7.007	- Materials Embodied Emission Intensity (High)	2,838	tCO2e	*= M7.007 x M7.003*
	M7.008	**- MEDIUM BENCHMARK EMISSION INTENSITY**	**386**	kgCO2e/m2GFA	***= M7.006 / M7.004 x 1000***

APPENDIX B.3 Greenhouse Gas Emissions Inventory - CONSTRUCTION

PLEIADES

COMPANY: **Rottnest Island Authority**
FACILITY: **Development of Workers Accommodation**
PERIOD: **2025-2030**
REASON: **EPA Referral**

CALCULATION SHEET
Original Page Size: A4
Landscape
Prepared by: Sam Nelson - Pleiades

ITEM N°	ITEM	VALUE	UNITS	COMMENT
	6 - Total Energy and Carbon - Construction			
	6a - Total Diesel Usage	**105**	**kL**	***= C1.017 + C2.023 + C2.034 + C2.043 + C2.063 + C4.007 + C6.011 + C3.004***
	6b - Total Carbon Loss	**129**	**tC**	***= C3.012***
	6c - Total GHG Emissions from Construction	**1,375**	**tCO2-e**	***= 4a+4b***
C1	**Earthworks Energy Model**			
	- Energy Factors			
C1.001	- Cut to Fill Diesel	0.001	kL/m3	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects*
C1.002	- Cut to Spoil Diesel	0.004	kL/m3	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects*
C1.003	- Import and Place Filling Diesel	0.0035	kL/m3	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects*
C1.004	- Top Soil Strip Respread	0.0012	kL/m3	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects*
	- Material movements			
C1.005	- Cut to Fill Diesel	70000.000	m3	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C1.006	- Cut to Spoil Diesel	0.000	m3	
C1.007	- Import and Place Filling Diesel	0.0000	m3	
C1.008	- Top Soil Strip Respread	0.0000	m3	
	- Formula			***Qd= Vm x Fd***
C1.013	- Cut to Fill Diesel	70.000	kL	*= C1.013 x C1.001*
C1.014	- Cut to Spoil Diesel	0.000	kL	*= C1.014 x C1.002*
C1.015	- Import and Place Filling Diesel	0.0000	kL	*= C1.015 x C1.003*
C1.016	- Top Soil Strip Respread	0.0000	kL	*= C1.016 x C1.004*
C1.017	**- TOTAL DIESEL**	**70**	**kL**	***= C1.013 + C1.014 + C1.015 + C1.016***
C2	**Non-Accomodation Construction Energy Model**			
	- Energy Factors - Pavements			
C2.001	- Granular	0.002	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.002	- Prime	0.000	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.003	- Warm Asphalt	0.0016	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.004	- Deep Strength Asphalt	0.0022	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.005	- Full Depth Asphalt	0.0017	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.006	- Median and traffic island infill	0.000	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.007	- Concrete Footpaths	0.000	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
C2.008	- Asphalt bicycle Paths	0.0007	kl/m2	*From Table 5-8 NSW Transport Group GHG Assessments Road Projects*
	- Pavement Areas			
C2.009	- Prime - Seal	0.000	m2	
C2.010	- DGA10 Asphalt - Warm asphalt	0.000	m2	
C2.011	- OGA10 Asphalt - Deep strength asphalt	0.0000	m2	
C2.012	- C10 Asphalt - Full depth asphalt	1480.000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C2.013	- Median and traffic island infill	0.0000	m2	
C2.014	- Concrete Footpaths	3725.000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C2.015	- Asphalt bicycle Paths	0.000	m2	
	- Formula			***Qd= Ap x Fd***
C2.016	- Prime	0.000	kL	*= C2.009 x C2.002*
C2.017	- DGA10 Asphalt	0.000	kL	*= C2.010 x C2.003*
C2.018	- OGA10 Asphalt	0.0000	kL	*= C2.011 x C2.004*
C2.019	- C10 Asphalt	2.5012	kL	*= C2.012 x C2.005*
C2.020	- Median and traffic island infill	0.0000	kL	*= C2.013 x C2.006*
C2.021	- Concrete Footpaths	0.373	kL	*= C2.014 x C2.007*
C2.022	- Asphalt bicycle Paths	0.000	kL	*= C2.015 x C2.008*
C2.023	**- TOTAL DIESEL**	**3**	**kL**	***= C2.016 + C2.017 + C2.018 + C2.020 + C2.021 + C2.022***
	- Energy Factors - Road Structures			
C2.024	- Retaining Wall - Concrete	0.000	kL/m3	*From Table 5-9 NSW Transport Group GHG Assessments Road Projects*
C2.025	- Reinforced soil walls	0.048	kL/m3	*From Table 5-9 NSW Transport Group GHG Assessments Road Projects*
C2.026	- Bridges - Precast concrete beam	0.0380	kL/m3	*From Table 5-9 NSW Transport Group GHG Assessments Road Projects*
C2.027	- Bridges - Steel beam	0.0380	kL/m3	*From Table 5-9 NSW Transport Group GHG Assessments Road Projects*
	- Road Structure Materials Used			
C2.028	- Retaining wall - Concrete	0.0000	m3	
C2.029	- Retaining wall - Concrete Precast	0.000	m3	
C2.030	- Retaining wall - Limestone blocks	0.000	m3	
	- Formula			***Qd= Vm x Fd***
C2.031	- Retaining wall - Concrete	0.0000	kL	*= C2.028 x C2.027*
C2.032	- Retaining wall - Concrete Precast	0.000	kL	*= C2.029 x C2.026*
C2.033	- Retaining wall - Limestone blocks	0.000	kL	*= C2.030 x C2.025*
C2.034	**- TOTAL DIESEL**	**-**	**kL**	
	- Energy Factors - Drainage			
C2.035	- Culverts - Small (<450 RCP)	0.035	kL/m	*From Table 5-10 NSW Transport Group GHG Assessments Road Projects*
C2.036	- Culverts - Medium (450 - 750 RCP)	0.045	kL/m	*From Table 5-10 NSW Transport Group GHG Assessments Road Projects*
C2.037	- Culverts - Large (750 - 1200 RCP)	0.0950	kL/m	*From Table 5-10 NSW Transport Group GHG Assessments Road Projects*
C2.038	- Kerbing - Semi-mountable Kerb	0.0003	kL/m	*From Table 5-10 NSW Transport Group GHG Assessments Road Projects*
	- Length of Drains			
C2.039	- Culverts Concrete	0.0000	m	
C2.040	**- Kerbing concrete**	**-**	**m**	

	- Formula			***Qd= Vm x Fd***
C2.041	- Culverts Concrete	0.000	kL	*= C2.039 x C2.037*
C2.042	- Kerbing concrete	0.0000	kL	*= C2.040 x C2.035*
C2.043	**- TOTAL DIESEL**	**-**	**kL**	
	- Energy Factors - Road Furniture			
C2.044	- W Beam	0.001	kL/m	*From Table 5-11 NSW Transport Group GHG Assessments Road Projects*
C2.045	- Concrete	0.040	kL/m	*From Table 5-11 NSW Transport Group GHG Assessments Road Projects*
C2.046	- Wire Rope Barrier	0.0006	kL/m	*From Table 5-11 NSW Transport Group GHG Assessments Road Projects*
	- Length of Road Furniture			
C2.047	- W-Beam Steel	0.000	m	
C2.048	- Modified Thriebeam Steel	0.000	m	
C2.049	- Concrete TL5 barrier	0.0000	m	
C2.050	- Steel Agricutural 1200	0.000	m	
C2.051	- Steel Chainwire 1400 (MRWA spec)	0.000	m	
C2.052	- Steel Chainwire 1400 (COW spec)	0.000	m	
C2.053	- Steel Chainwire 1800 (MRWA spec)	0.0000	m	
C2.054	- Steel Chainwire 1800 (COW spec)	0.000	m	
	- Formula			***Qd= Vm x Fd***
C2.055	- W-Beam Steel	0.000	kL	*= C2.047 x C2.044*
C2.056	- Modified Thriebeam Steel	0.0000	kL	*= C2.048 x C2.044*
C2.057	- Concrete TL5 barrier	0.0000	kL	*= C2.049 x C2.045*
C2.058	- Steel Agricutural 1200	0.000	kL	*= C2.050 x C2.046*
C2.059	- Steel Chainwire 1400 (MRWA spec)	0.000	kL	*= C2.051 x C2.046*
C2.060	- Steel Chainwire 1400 (COW spec)	0.000	kL	*= C2.052 x C2.046*
C2.061	- Steel Chainwire 1800 (MRWA spec)	0.000	kL	*= C2.053 x C2.046*
C2.062	- Steel Chainwire 1800 (COW spec)	0.0000	kL	*= C2.054 x C2.046*
C2.063	**- TOTAL DIESEL**	**-**	**kL**	***= C2.055 + C2.056 + C2.057 + C2.058 + C2.059 + C2.060 + C2.061 + C2.062***
C2.064	**- TOTAL NON-ACCOMODATION CONSTRUCTION DIESEL**	**3**	**kL**	

C3	**Land Clearing**			
	- Energy Factors - Land Clearing			
C3.001	- Clearing Class 3 Vegetation	1.600	kL/Ha	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects*
	- Area Cleared			
C3.002	- Workers Accommodation Cleared Area	3.470	Ha	*Land clearing permits*
	- Formula			***Qd= Vm x Fd***
C3.003	- Workers Accommodation Cleared Area	5.552	kL	*= C3.002 x C2.044*
C3.004	**- TOTAL CLEARING DIESEL**	**5.5520**	**kL**	***= C3.003***
	- Carbon Factors - Land Clearing			
C3.005	- Carbon Loss From Trees	35.480	tC/Ha	*Fullcam Zone1.plo*
C3.006	- Foregone Sequestration	3.1133	tC/Ha	
C3.007	- Foregone Debris Buildup	0.379	tC/Ha	
C3.008	- Foregone Soil Carbon Change	-1.020	tC/Ha	
	- Total Carbon Lost and Foregone			
C3.009	- RIA WA Site	37.953	tC/Ha	*= C3.005 + C3.006 + C3.007 + C3.008*
	- Area Cleared			
C3.010	- RIA WA Site	3.400	Ha	*Land clearing permits*
	- Formula			***Qd= Vm x Fd***
C3.011	- RIA WA Site	129.039	tC	*= C3.010 x C3.009*
C3.012	**- TOTAL CLEARING CARBON LOSS**	**129**	**tC**	***= C3.011***

C4	**Admin Energy Model**			
	- Energy Factors			
C4.001	- Field Office Stationary Energy Use	0.112	kL/month	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects - 18m3 office*
C4.002	- Light Vehicle Usage	0.3250	kL/month	*From Table 5-6 NSW Transport Group GHG Assessments Road Projects - 1 Hi Lux*
	- Time Period of Construction			
C4.003	- Field Office Stationary Energy Use	60.0	month	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C4.004	- Light Vehicle Usage	60.0	month	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	- Formula			***Qd= Tm x Fd***
C4.005	- Field Office Stationary Energy Use	6.7	kL	*= C4.005 x C4.001*
C4.006	- Light Vehicle Usage	19.5	kL	*= C4.006 x C4.002*
C4.007	**- TOTAL DIESEL**	**26**	**kL**	***= C4.005 + C4.006***

C5	**Benchmark Estimates For Accommodation Buildings**			
	- Energy Factors			
C5.001	- Construction Emission Intensity (Low)	76.9	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
C5.002	- Construction Emission Intensity (Medium)	102.6	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
C5.003	- Construction Emission Intensity (High)	128.0	kgCO2e/m2GFA	*From Table A6.1 NSW Transport Embodied Carbon Measurement for Infr.*
	- Benchmark Drivers			
C5.004	- Modular Accommodation Units [149 no]	5810	m2GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C5.005	- Modular Stores	78	m2GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
C5.006	- Gross Floor Area of Dwellings	5888	m2 GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	- Benchmark Emissions			***Qd= Tm x Fd / 1000***
C5.007	- Construction Emission Intensity (Low)	453	tCO2e	*= C5.007 x C5.001 / 1000*
C5.008	**- Construction Emission Intensity (Medium)**	**604**	**tCO2e**	*= C5.008 x C5.002 / 1000*
C5.009	- Construction Emission Intensity (High)	754	tCO2e	*= C5.009 x C5.003 / 1000*

C6	**Waste Transport Energy Model**			
	- Energy Factors			
C6.001	- Heavy Truck 12t≤GVM≤25t	0.001	kL/km	*From Table 5-4 NSW Transport Group GHG Assessments Road Projects*
C6.002	- Medium Truck 3.5t≤GVM≤12t	0.0003	kL/km	*From Table 5-4 NSW Transport Group GHG Assessments Road Projects*
C6.003	- Container Barges Small (90TEU)	0.0313	kgCO2-e/tonne.km	*From Table 10 ECTA Guidelines for Measuring and Managing CO2 Emission from Freight Transport Operations*
	- Material movements			
C6.004	- Transport Waste to Landfill	100	Tonne	
C6.005	- Round Trip Distance to Landfill	40	km	*By Road from Fremantle Rottnest Ferry Terminal to SMRC Recovery Centre*
C6.006	- Average truck load	10	Tonne	*Average load of a Heavy Truck*
C6.007	- Transport Waste to Freo Port (barge)	10	Tonne	*Average load of Barge*
C6.008	- Round Trip Rottnest Port to Freo Port	40	km	*By Sea from Rottnest Island Main Port to Fremantle Ferry Terminal*
C6.009	- Transport Waste Average Weight (barge)	5	Tonne	*= C6.007 / 2*
	- Formula			***Qd= Vm x Fd***
C6.010	- Transport Waste To Landfill Fuel Factor	0.00002	kL/tonne	*= C6.005 x C6.001 / (C6.004 x C6.006)*
C6.011	- Transport Waste To Landfill Diesel Consumption	0.0022	kL	*= C6.010 x C6.004*
C6.012	**- ROAD TRANSPORT EMISSIONS**	**0.01**	**tCO2-e**	***= C6.011 x C6.009 x C6.008 / 1000***
C6.013	**- WATER TRANSPORT EMISSIONS**	**0.13**	**tCO2-e**	***= C6.003 x 3a x (3b+3c+3d) / 1000***
C6.014	- Transport Emission Factor per tonne waste	0.00131	tCO2-e/tonne	*= C6.012 + C6.013 / 2*

APPENDIX B.4 Greenhouse Gas Emissions Inventory - OPERATION

PLEIADES

COMPANY: **Rottnest Island Authority**
FACILITY: **Development of Workers Accommodation**
PERIOD: **2025-2030**
REASON: **EPA Referral**

CALCULATION SHEET
Original Page Size: A4
Landscape
Prepared by: Sam Nelson - Pleiades

ITEM N°	ITEM	VALUE	UNITS	COMMENT
7	**Total Energy and Carbon - Operations**			
7a	**- Total Diesel Usage**	**1**	**kL**	*= D2.017*
7b	**- Total Electricity**	**2,887**	**MWH**	*= D1.077*
7c	**- Total GHG Emissions from Operations**	**5,355**	**tCO2-e**	*= 4d+4e+4f*
D1	**Operations Energy Model**			
	- Model Drivers			
D1.001	- Gross Floor Area of Dwellings	5888.0000	m2 GFA	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.002	- Average residential consumption in WA	5200.000	kWh/year	*From Australian Energy Regulator - Residential energy consumption benchmarks 2020*
D1.003	- Internal lighting (percentage of residential consumption)	11.500	%	*From https://www.energy.gov.au/households/household-guides/work-advice/home-based-business*
D1.004	- Hotplates and rangehood (percentage of residential consumption)	7.500	%	*From https://www.energy.gov.au/households/household-guides/work-advice/home-based-business*
	- Energy Factors - Operations			
D1.005	- PSP Light pole (LED)	60.000	watts	*From Table 6-3 NSW Transport Group GHG Assessments Road Projects*
D1.006	- Single pole (LED)	60.000	watts	*From Table 6-3 NSW Transport Group GHG Assessments Road Projects*
D1.007	- Single pole - Western Power (LED)	60.0000	watts	*From Table 6-3 NSW Transport Group GHG Assessments Road Projects*
D1.008	- Double light pole - Western Power (LED)	120.000	watts	*From Table 6-3 NSW Transport Group GHG Assessments Road Projects*
D1.009	- Distribution board	50.000	watts	*From Table 6-3 NSW Transport Group GHG Assessments Road Projects*
D1.010	- Split system reverse cycle aircon unit	500.0000	kWh/year	*From DCEEW 2025 (average values) - www.yourhome.gov.au/energy/appliances*
D1.011	- Hot water unit	3800.000	kWh/year	*From CRIS – Electric Storage Water Heaters 2013 - www.energyrating.gov.au*
D1.012	- Internal lighting	598.000	kWh/year	*= (D1.003 x D1.002) / 100*
D1.013	- Hotplates and rangehood	390.000	kWh/year	*= (D1.004 x D1.002) / 100*
D1.014	- Refrigerators	350.0000	kWh/year	*From DCEEW 2025 (average values) - www.yourhome.gov.au/energy/appliances*
D1.015	- Washing machines	250.000	kWh/year	*From DCEEW 2025 (average values) - www.yourhome.gov.au/energy/appliances*
D1.016	- Clothes Dryers	450.000	kWh/year	*From DCEEW 2025 (average values) - www.yourhome.gov.au/energy/appliances*
	- Lighting and appliances timeline			
D1.017	- Life of development	50.000	years	*Remaining GHG emission years*
D1.018	- Lighting lifecycle for lighting	20.000	years	*Standard assumption of stable grid (BAU)*
	- Numbers of Electrical Equipment			
D1.019	- PSP Light pole	0.000	Count	
D1.020	- Single pole	0.000	Count	
D1.021	- Single pole - Western Power	0.000	Count	
D1.022	- Double light pole - Western Power	0.000	Count	
D1.023	- Distribution board	0.000	Count	
D1.024	- Split system reverse cycle aircon unit	149.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.025	- Hot water unit	149.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.026	- Internal lighting	149.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.027	- Hotplates and rangehood	149.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.028	- Refrigerators	149.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.029	- Washing machines	37.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D1.030	- Clothes Dryers	37.000	Count	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	- RIA Electricity Emission Factors and Targets			
D1.031	- Rottnest Island Austority 2020-2024 Electricity Emission Factor	0.497	kgCO2-e/kWh	*230405 RIA GHG emissions inventory as of 05122024*
D1.032	- WA Transitional Target 2030	80.000	%	*2030 transitional target (80% below 2020 levels)*
D1.033	- SBTi Net Zero Sectoral Standard for Electricity by 2043	99.000	%	*SBTi Net Zero Sectoral Standard for Electricity*
D1.034	- WA Net Zero Target 2050	100.000	%	*2050 Net Zero target*
	- Emission Factor targets			
D1.033	- RIA Transitional Emission Factor Target 2030	0.099	kgCO2-e/kWh	*= (100 - D1.032) x D1.031*
D1.034	- RIA SBTi Emission Factor Target 2043	0.005	kgCO2-e/kWh	*= (100 - D1.033) x D1.031*
	- Annual reduction targets			
D1.035	- Annual reduction from 2025 to 2030	23.528	%	*= 1 - (D1.033/D1.031)^(1/6) x 100*
D1.036	- Annual reduction from 2030 to 2043	20.582	%	*= 1 - (D1.034/D1.033)^(1/13) x 100*
	- Net Zero Grid Curve			
D1.037	- 2020 to 2024	1.000	ratio decrease	*Western Australia Renewables Prediction Base Year*

D1.038	2025	0.765	ratio decrease	*= D1.037 x (1 - (D1.035/100))*
D1.039	2026	0.585	ratio decrease	*= D1.038 x (1 - (D1.035/100))*
D1.040	2027	0.447	ratio decrease	*= D1.039 x (1 - (D1.035/100))*
D1.041	2028	0.342	ratio decrease	*= D1.040 x (1 - (D1.035/100))*
D1.042	2029	0.262	ratio decrease	*= D1.041 x (1 - (D1.035/100))*
D1.043	2030	0.200	ratio decrease	*Western Australia 2030 transition target of 80% below 2020 levels*
D1.044	2031	0.159	ratio decrease	*= D1.043 x (1 - (D1.036/100))*
D1.045	2032	0.126	ratio decrease	*= D1.044 x (1 - (D1.036/100))*
D1.046	2033	0.100	ratio decrease	*= D1.045 x (1 - (D1.036/100))*
D1.047	2034	0.080	ratio decrease	*= D1.046 x (1 - (D1.036/100))*
D1.048	2035	0.063	ratio decrease	*= D1.047 x (1 - (D1.036/100))*
D1.049	2036	0.050	ratio decrease	*= D1.048 x (1 - (D1.036/100))*
D1.050	2037	0.040	ratio decrease	*= D1.049 x (1 - (D1.036/100))*
D1.051	2038	0.032	ratio decrease	*= D1.050 x (1 - (D1.036/100))*
D1.052	2039	0.025	ratio decrease	*= D1.051 x (1 - (D1.036/100))*
D1.053	2040	0.020	ratio decrease	*= D1.052 x (1 - (D1.036/100))*
D1.054	2041	0.016	ratio decrease	*= D1.053 x (1 - (D1.036/100))*
D1.055	2042	0.013	ratio decrease	*= D1.054 x (1 - (D1.036/100))*
D1.056	2043	0.010	ratio decrease	*SBTi Net Zero Sectoral Standard for Electricity*
D1.057	2044	0.000	ratio decrease	
D1.058	2045	0.000	ratio decrease	
D1.059	2046	0.000	ratio decrease	
D1.060	2047	0.000	ratio decrease	
D1.061	2048	0.000	ratio decrease	
D1.062	2049	0.000	ratio decrease	
D1.063	2050	0.000	ratio decrease	
D1.064	**- Equivalent Net Zero years to 2050**	**3.333**	**years**	***Remaining GHG emission years - 2020-24 Baseline Emission Factors***
	- Formula Lighting			***Qp= Qe x Jp x Th x Td x Ty / 1,000,000***
	- Formula Appliances			***Qp= Qpy x Jp x Nye / 1,000***
D1.065	- PSP Light pole		MWh	*= D1.019 x D1.005 x 12 x 365/1,000,000 x D1.064*
D1.066	- Single pole		MWh	*= D1.020 x D1.006 x 12 x 365/1,000,000 x D1.064*
D1.067	- Single pole - Western Power		MWh	*= D1.021 x D1.007 x 12 x 365/1,000,000 x D1.064*
D1.068	- Double light pole - Western Power		MWh	*= D1.022 x D1.008 x 12 x 365/1,000,000 x D1.064*
D1.069	- Distribution board		MWh	*= D1.023 x D1.009 x 12 x 365/1,000,000 x D1.064*
D1.070	- Split system reverse cycle aircon unit	248.340	MWh	*= D1.010 x D1.024 x D1.064 /1000*
D1.071	- Hot water unit	1887.383	MWh	*= D1.011 x D1.025 x D1.064 /1000*
D1.072	- Internal lighting	297.014	MWh	*= D1.012 x D1.026 x D1.064 /1000*
D1.073	- Hotplates and rangehood	193.705	MWh	*= D1.013 x D1.027 x D1.064 /1000*
D1.074	- Refrigerators	173.838	MWh	*= D1.014 x D1.028 x D1.064 /1000*
D1.075	- Washing machines	30.834	MWh	*= D1.015 x D1.029 x D1.064 /1000*
D1.076	- Clothes Dryers	55.501	MWh	*= D1.016 x D1.030 x D1.064 /1000*
D1.077	**TOTAL LIGHTING/APPLIANCE POWER From Non-Renewables**	**2886.616**	**MWh**	***= D1.065 + D1.066 + D1.067 + D1.068 + D1.069 + D1.070 + D1.071 + D1.072 + D1.073 + D1.074 + D1.075 + D1.076***

D2	**Maintenance Energy Model**			
	- Energy Factors			
D2.001	- Maintenance Warm Asphalt	0.0004	kL/m2	*From Table 7-3 NSW Transport Group GHG Assessments Road Projects*
D2.002	- Maintenance Deep Strength Asphalt	0.0005	kL/m2	*From Table 7-3 NSW Transport Group GHG Assessments Road Projects*
D2.003	- Maintenance Full Depth Asphalt	0.0004	kL/m2	*From Table 7-3 NSW Transport Group GHG Assessments Road Projects*
D2.004	- Years of Maintenance	30.0000	yr	
	- Material movements			
D2.005	- 5mm nominal seal - Warm asphalt	0.000	m2	
D2.006	- 14/7mm Double seal - Warm asphalt	0.000	m2	
D2.007	- DGA7 Laterite Asphalt - Warm asphalt	0.000	m2	
D2.008	- DGA10 Asphalt - Warm asphalt	0.0000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
D2.009	- OGA10 Asphalt - Deep strength asphalt	0.0000	m2	
D2.010	- C10 Asphalt - Full depth asphalt	1480.0000	m2	*RIA Workers Accommodation Village Design Stage Est - RBB - Dec 2024*
	- Formula			***Qd= Vm x Fd***
D2.011	- 5mm nominal seal - Warm asphalt	0.000	kL	*= D1.009 x D2.001*
D2.012	- 14/7mm Double seal - Warm asphalt	0.000	kL	*= D1.010 x D2.001*
D2.013	- DGA7 Laterite Asphalt - Warm asphalt	0.0000	kL	*= D1.011 x D2.001*
D2.014	- DGA10 Asphalt - Warm asphalt	0.0000	kL	*= D1.012 x D2.001*
D2.015	- OGA10 Asphalt - Deep strength asphalt	0.000	kL	*= D2.009 x D2.002*
D2.016	- C10 Asphalt - Full depth asphalt	0.636	kL	*= D2.010 x D2.003*
D2.017	**TOTAL MAINTENANCE DIESEL**	**0.636**	**kL**	***= D2.011 + D2.012 + D2.013 + D2.014 + D2.015 + D2.016***

Attachment 3: Revegetation Management Plan

ROTTNEST ISLAND AUTHORITY

PARKER POINT ROAD (EAST)

STAFF HOUSING

REVEGETATION MANAGEMENT PLAN

October 2024

Rottnest Island Authority

ROTTNEST ISLAND AUTHORITY

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1. Introduction

Land use planning activities have identified the area around the airport as suitable for a future light industrial area where the operational activities of the island's primary building and maintenance contractor can be located. Associated with this land use is the need for a dedicated area where operational and maintenance staff can be accommodated into a staff housing village.

The Parker Point Road site was selected to facilitate the development of staff housing for the island's operation and maintenance contractor for the following reasons:

- existing staff housing is on Parker Point Road - locating staff housing in one location demonstrates proper and orderly planning.
- the location will be in close proximity to the future operational base of the island's maintenance contractor.
- location is within the prescribed settlement boundary, which is approved for accommodation under the Rottnest Island Authority Act 1987.
- location can utilise existing water infrastructure on Parker Point Road and a scheduled electrical upgrade on Parker Point Road.
- location is identified in the RIMP Land Use Plan as 'Mixed Use'.

The Rottnest Island Authority (**RIA**) was granted a Native Vegetation Clearing Permit (NVCP) (CPS 9883/1) on 6 December 2023 to clear 2.78 hectares (ha) of native vegetation along the western end of Parker Point Road. It is noted that staff housing for both the Hotel Rottnest Samphire Resort (constructed and operational from late 2020) and The Lodge Wadjemup (under construction and operational from approx. 2024) developments is to be incorporated into the area covered under Clearing Permit CPS 9883/1.

A new application for a NVCP was submitted to the DWER and accepted by the DWER on 21 December 2023 to clear 3.29 ha of native vegetation along the eastern end of Parker Point Road (CPS 10450/1) (**Figure 1**). The clearing area located along the eastern end of Parker Point Road is physically separated from the western area because cultural heritage surveys identified three cultural sites that limited development in this area (**Figure 2**). Each NCVP area does not contain any cultural sites.

The NVCP application proposes to clear 3.29 hectares which has been mapped as *Melaleuca lanceolata* and *Acanthocarpus pressei* (MlAP) woodland (360 Environmental, 2022; Focus Vision Consulting, 2022; and RPS, 2023). This vegetation unit is analogous with the TEC 30a and is the subject of the proposed offset and this revegetation plan.

For this proposal:

- **Figure 1** identifies the location of proposed site for clearing.
- **Figure 2** identifies the cultural sites located along Parker Point Road.

The purpose of the Parker Point Road (East) Revegetation Management Plan (**this Plan**) is to address the environmental impacts associated with clearing of native vegetation for the development of staff housing.

This Plan is intended as a guide for the revegetation of three separate offset areas located in the center of the island, which is discussed further in Section 3.1.3.

The total indicative offset area in hectares has been calculated as 13.74, based upon the proposed clearing of 3.29 hectares of vegetation analogous to TEC. Areas of offset will be planted for conservation purposes and will be protected in perpetuity from future development. It is expected that this level of protection will be endorsed by the Rottnest Island Board and/ or Minister, and also the next version of the Rottnest Island Management Plan will include a provision for in-perpetuity protection of offset sites.

This plan has been developed by Rebecca Gabbitus who is employed by the Rottnest Island Authority. Rebecca holds a Bachelor of Science (honours) in Zoology and Geology and a Post Graduate Diploma in Environmental Management. Rebecca has over 20 years' experience in developing management plans, and approvals and on ground implementation of revegetation projects.

The Key Contacts for this works are:

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The RIA has undertaken woodland revegetation projects annually, since the 1990's, as part of operations and has the internal resources and expertise to deliver on completion criteria and onsite revegetation techniques.

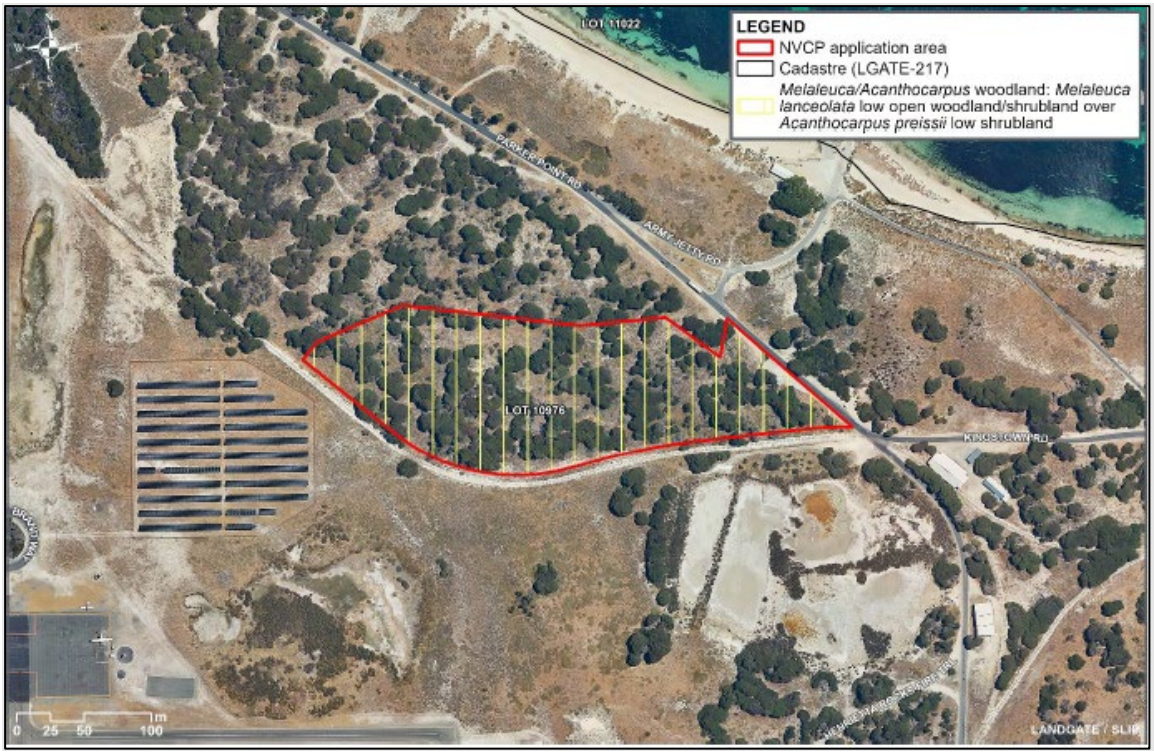

Figure 1: Clearing Site (Red boundary)

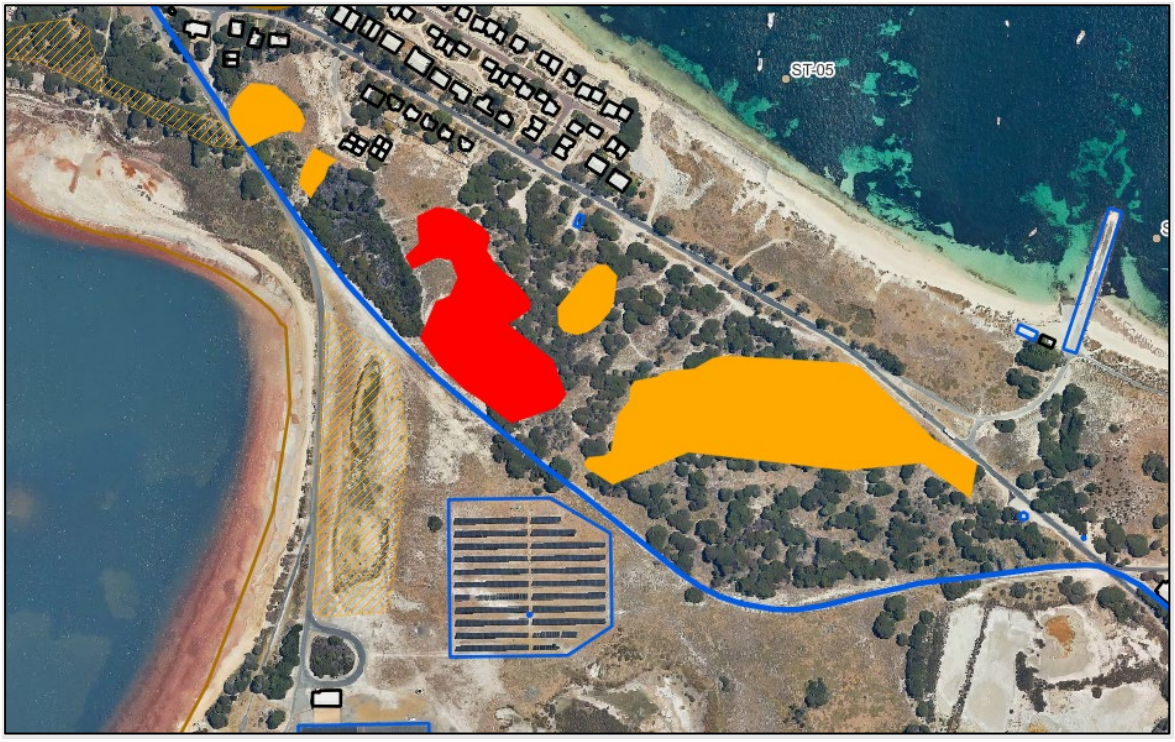

Figure 2: Aboriginal Cultural sites – Red (Registered), Yellow (Lodged); Black lines (Buildings); Blue lines (Infrastructure).

2. Background

The RIA has been undertaking revegetation programs since the early 1990's. Since 2016 the RIA have implemented works under the Woodland Plan, a key initiative delivering against the Rottnest Island Management Plan's Strategic focus area - engage with, promote and preserve the islands environment and cultural heritage, with a focus on Aboriginal cultural heritage. Delivery of the plan shall result in the enhancement and expansion of Woodland habitat on Rottnest Island and increasing opportunities for visitors and volunteers to engage and contribute to the conservation of one of Rottnest Island's most important habitats.

Despite revegetation efforts, the woodland on Rottnest Island is not naturally regenerating. Quokka grazing has been identified as the principal factor limiting regeneration, therefore quokka exclusion vital to the success of revegetation efforts.

The Woodland Plan aims to:

- Expand, enhance and maintain the woodland community on Rottnest Island to contribute to the conservation of the threatened ecological community, and the provision of fauna habitat.
- Improve the natural recreation amenity of the Island, while providing unique woodland recreation opportunities for visitors.

Extensive research and partnerships since 2007 have integrated a framework and strategy for woodland restoration on the Island. In selecting revegetation sites, the following is considered:

- Suitability for woodland growth
- Providing connectivity between existing sites
- Recreational amenity needs
- Protection and enhancement of fauna habitat (birds, Perth slider, quokka, bats etc)
- Minimisation of impacts to groundwater recharge required for freshwater ecosystems
- Cultural heritage requirements
- Retention of coastal and wetland vistas.

2.1. Ownership Details

The Parker Point Road Development site is located on Lot 16713 Deposited Plan 216860, which is Crown Land managed under the *Rottnest Island Authority Act 1987* (RIA Act) by the Rottnest Island Authority. The area falls within the designated Settlement Area, which allows development for accommodation.

Rottnest Island is a Class A Reserve (no. 16713). The control and management of the Island is vested in the Authority for the purpose of enabling it:

(a) to provide and operate recreational and holiday facilities on the Island;

(b) to protect the flora and fauna of the Island; and

(c) to maintain and protect the natural environment and the man-made resources of the Island and, to the extent that the Authority's resources allow, repair its natural environment. The RIA Act clearly sets out the boundary of the settlement for the purpose of accommodation development within the Reserve. The remainder of the island is designated Reserve for the purpose of conservation and recreation, deemed as no development unless prescribed.

3. Clearing site

3.1. Site History

Based on inspection of aerial photos the Parker Point area has been cleared a number of times:

- Prior to 1941 it was partially cleared.
- Between 1941 and 1955 it was fully cleared of Melaleucas.

There is evidence that planting may have occurred in 1994, the RIA would suggest that the area is a mix of regrowth and planting.

3.2. Vegetation

RIA commissioned three flora and vegetation surveys between 2021 to 2023. One survey each by 360 Environmental, Focused Vision and RPS.

One vegetation type was identified within the clearing area, being MlAp that was represented by *M. lanceolata* low open woodland/shrubland over *Acanthocarpus preissii* low shrubland (**Figure 3**). RPS (2023) also observed examples of *Callitris preissii* alongside *M. lanceolata* within the areas as well. These species are the key taxa describing the SCP30a TEC, as well as the common community species *A. preissii*. For this reason, these vegetation types were considered analogous to the SCP30a TEC.

The proposal includes the clearing of up to 3.29 ha of potential TEC. The vegetation condition within the Survey Area ranged from Very Good to Degraded.

Figure 3 Vegetation types of the clearing site

3.3. Fauna

Conservation of significant fauna which are known to be located in the CPS 10450/1 clearing site includes:

- *Setonix brachyurus* (Quokka) – Vulnerable
- *Lerista lineata (*Perth slider, lined skink) – P3
- *Pseudonaja affinis exilis (*Rottnest Island dugite) – P4
- *Tiliqua rugosa konowi (*Rottnest Island bobtail) – Vulnerable.

3.4. Other ecological considerations

Quokkas are primarily nocturnal and on Rottnest Island they tend to rest under vegetative cover such as *Acacia rostellifera* or *Melaleuca lanceolata* thickets or *Acanthocarpus preissii* heath during the day, and move around to graze at night (Shield, 1958; Dunnet, 1962).

Quokka Shelter species include:

- *Melaleuca lanceolata*
- *Callitris preissii*
- *Acanthocarpus preissii,*
- *Austrostipa flavescens.*

Quokkas have a varied diet and from previous studies preference for:

- *Melaleuca lanceolata*
- *Scaevola crassifolia*
- *Acacia rostellifera*
- *Rhagodia baccata*
- *Carpobrotus verensus*
- *Guichenotia ledifolia.*

4. Proposed Offset Sites

The RIA are proposing to revegetate three areas including:

- Northern TEC occurrence: Comprising an area of 1.71 ha of 'Good' condition vegetation.
- Central TEC occurrence: Comprising an area of 1.48 ha of 'Good' condition vegetation, 1.8 ha of 'Good-Degraded' condition vegetation and 0.47 ha of 'Degraded' condition vegetation.
- Buffer zone: Comprising an area of 8.28 ha located to the south of an existing TEC located adjacent to Lake Serpentine. The area will provide connectivity to the existing mapped area of TEC 30a and also the offset site for CPS 9883/1 to the west.

The offset areas are shown on **Figure 4** below and are discussed in further detail in the following sections.

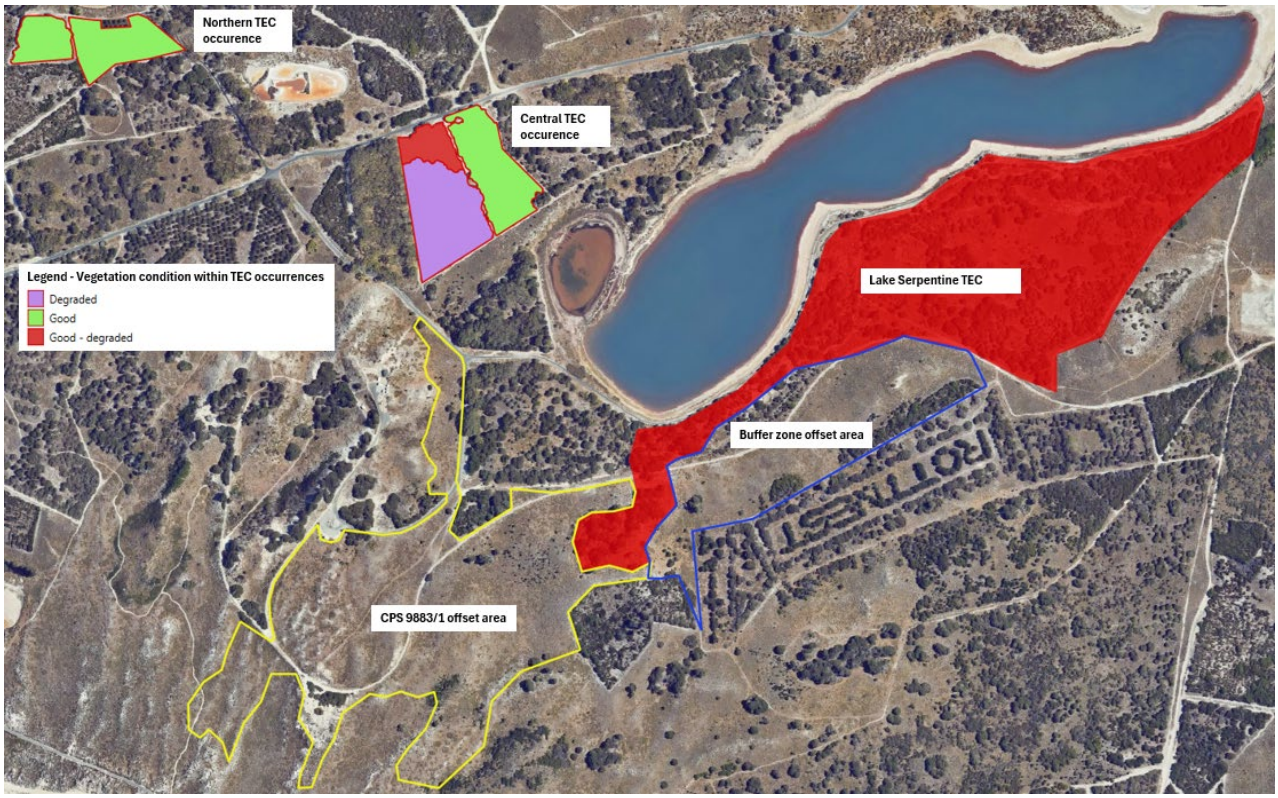

Figure 4: Proposed Offset sites including Northern and Central TEC occurrences and the buffer zone site. The existing Lake Serpentine TEC is shown (red) and CPS 9883/1 offset site (yellow).

4.1. Vegetation

The vegetation of the Northern and Central TEC occurrences were surveyed by Emerge Associates (2024) and provided as **Attachment 1**. The vegetation is summarised below:

- Northern TEC occurrence: The vegetation was observed to comprise vegetation unit **MlCp** – low open to closed woodland or shrubland of *Melaleuca lanceolata* and *Callitris preissii* over open to closed forbland of *Acanthocarpus preissii*, *Rhagodia baccata* subsp. *dioica, Poa poiformis* and *Austrostipa flavescens* (Emerge Associates 2024). The condition ranged from 'Good' to 'Very good-good' and was likely to be representative of TEC SCP 30a. Vegetation surrounding the site was observed to be similar in composition, dominated by *Melaleuca lanceolata* and *Callitris preissii*, and soils were noted to be calcareous sands of the Quindalup Dunes consistent with the TEC description. Photos of the site are provided in **Attachment 1**.

- Central TEC occurrence: The vegetation composition of this area was reported by Emerge Associates (2024) to be the same as the Northern TEC occurrence. Emerge Associates (2024) identified that the vegetation condition ranged from 'degraded' to 'good' and was likely to be representative of TEC SCP 30a. Vegetation surrounding the site was observed to be similar to the site in composition, and soils were noted to be calcareous sands of the Quindalup Dunes consistent with the TEC description. Photos of the site are provided in **Attachment 1**.

Buffer zone: Vegetation currently present in this area includes *M. lanceolata*, *C. preissii*, *Rhagodia baccata*, *A. preissii, Conostylis candicans, Lepidosperma gladiatum* and *Pittosporum longifolia.* Inspections by RIA of the area identified the vegetation condition to be in a 'Completely Degraded' condition. Weeds predominantly comprised Dune Onion Weed (*Trachyandra divaricata*). Photos of the sites are shown in **Figures 5** and **6**.

Weeds listed in these sites were identified as:

- *Asphodelus fistulosus*
- *Cerastium glomeratum*
- *Erodium cicutarium*
- *Euphorbia peplus*
- *Galium murale*
- *Isolepis marginata*
- *Leontodon rhagadioloides*
- *Lysimachia arvensis*
- *Poaceae sp.*
- *Trachyandra divaricate*
- *Urtica urens.*

Figure 5: Buffer Offset site – Looking North.

Figure 6: Buffer Offset site – Looking South-East.

5. Revegetation commitments

Vision: To establish in perpetuity a vegetation community reflective of the *Callitris preissii* / *Melaleuca lanceolata* Woodland TEC. The revegetation plan will ensure the viability of the rehabilitated area of *Callitris preissii* / *Melaleuca lanceolata* Woodland TEC at the proposed offset sites which will include understory species including:

- *Acanthocarpus preissii;*
- *Rhagodia baccata* (berry saltbush);
- *Austrostipa flavescens;*
- *Trachymene pilosa* (native parsnip); and
- *Guichenotia ledifolia.*

Objectives: The objective of this Plan includes:

- Improve connectivity of woodland vegetation;
- Increase in woodland areas; and
- Decrease weed species coverage.

Areas of offset will be planted for biodiversity conservation purposes as required by the Native Vegetation Clearing Permit which requires the RIA to establish and maintain vegetation and ensure it will be protected in perpetuity from future development.

5.1. Threats to revegetation success

The key threats to revegetation success are discussed below:

- **Quokka grazing** - Despite revegetation efforts, the woodland on Rottnest Island is not naturally regenerating. Quokka grazing has been identified as the principal factor limiting regeneration. Heavy quokka grazing reduces the survival rate of naturally recruited woodland seedlings. This means there is a limited succession of younger plants needed to replace old trees and prevent woodlands from dying out.
- **Clearing** – Direct clearing for development (current and future), agriculture (past) and military (past) has seen the loss of the majority of the island woodland community and continues to impact the ongoing survival of the woodlands.
- **Fire -** Large scale and frequent burns in the past have been cited as one of the main contributors of Type 30a TEC decline on Rottnest Island. Juvenile *Callitris preissii* are especially fire sensitive and is unlikely to recover following a fire event. It has been noted it would take nine years after a fire for substantial regeneration and for seedlings to produce cones. *Melaleuca lanceolata* and *Callitris preissii* reproduce only by seed.
- **Weeds** - Weed control is an important aspect of any revegetation project and must be incorporated into this Plan. Invasive weeds are an important competitor when establishing native vegetation and must be controlled at the outset and throughout the time that the revegetation site is establishing to ensure success. Weed pressures on Rottnest Island are mainly from species already established on the Island such as Dune Onion Weed (*Trachyandra divaricata)*, and possible introductions of other species from visiting members of the public and contractors carrying weed seed across from the mainland.

6. Reference site floristic data collection

Vegetation mapping completed by Focus Vision Consulting in 2022 and RPS in 2023 did not include any quadrats within the clearing area. The entire area was mapped as comprising the vegetation unit of MlAp (*Melaleuca/Acanthocarpus* Woodland) and is considered to be in a good to degraded condition (RPS, 2023), therefore for the purposes of this Plan, the entire clearing area can be considered as a reference site. The upper level of the vegetation condition (i.e. Good) will be utilised for the offset.

In addition, the selected understory species mix outlined in Section 5.0, takes into consideration the above, the DBCA interim recovery plan No 340 and Methods for survey and identification of Western Australian threatened ecological communities.

- *Acanthocarpus preissii;*
- *Rhagodia baccata* (berry saltbush);
- *Austrostipa flavescens;*
- *Trachymene pilosa* (native parsnip); and
- *Guichenotia ledifolia.*

7. Targets and completion criteria

This revegetation will be implemented over 10 years, with at least 3 years of active planting. Target completion criteria include:

Tree species richness:	Minimum two dominant tree species present.
Species density:	Minimum 1,000 stems per hectare, which includes a minimum of 200 stems per hectare of tree species.
Weeds:	No declared weeds present.
Condition:	Vegetation condition rank maintained, or improved, based on impact area condition of vegetation surveys by RPS and Focus Vision Consulting.

8. Site preparation

The following section pertains to preparation of the offset areas for planting. The activities apply to all offset areas unless any specific deviations are noted.

Seed Collection and Propagation

Seed is collected only from native plants established on the Island. The Rottnest Island Conservation Centre provides facilities for seed storage, seed treatment and seedling propagation of native Rottnest species.

Site Preparation

There is no requirement for mulching or topsoil spreading as part of this project.

Weed treatment

Weeds within the offset areas will be managed according to the Weed Management outlined in Appendix A.

Timing

Planting will take place in the cooler wetter months of the year in late autumn and early winter and programmed around adequate rainfall.

Tree Guards

Tree guards are used to protect individual 50 mm tube stock. Each guard being a height of 0.5 m and made of plastic mesh. The mesh pattern allows for air flow and for trees to grow outside the confines of the guard. The current tree guards utilised by the RIA have shown to have the best combination of being long lasting and quokka resistant. There appears to be no evidence of guards fragmenting into smaller pieces of plastic over their 10-year life, as is often observed with corflute guards.

Methodology

With regards to planting density, this will occur at the maximum rate of 1 stem per 5 m^2 in areas with minimal vegetation density such as the Buffer offset area. In areas where vegetation is already present to some degree (i.e. the TEC occurrences), planting density will occur at a rate consistent with the surrounding vegetation density in order to meet the target completion criteria stated in Section 7.

Planting ratios:	Melaleuca, Callitris and understory
Understory species:	Acanthocarpus preissii
	Rhagodia baccata (berry saltbush)
	Austrostipa flavescens
	Trachymene pilosa (native parsnip)
	Guichenotia ledifolia
Planting density:	1 stem per 5 m^2 (0.2 plants per meter square) (all species), or at a rate consistent with the existing vegetation density.
Planting:	Forestry tubes
	Tree guards (fence sites to be investigated – smaller areas)

The planting method for woodland revegetation consists of:

1. Using an auger bit attached to a cordless drill to create a hole for planting.
2. Adding slow release fertiliser to each hole in the form of one low P Arbortab: ArborTab Native Tree Tablets - 20g - StrataGreen
3. Gently planting into hole.
4. Protecting each plant with a tree guard consisting of black plastic mesh cabled tied to two stakes.
5. All plants planted are 50mm forestry tubes.
6. Planting is undertaken by RIA staff, contractors or volunteers.
7. There is no watering planned for revegetation on the Island.

9. Maintenance, monitoring and contingency measures

Maintenance activities will be undertaken periodically over the 10 year period, which will be tied to monitoring. Revegetation data will be maintained using an online geographical information system (GIS) database to enable consistent documentation.

Monitoring will include establishment of five 10 x 10 meter quadrat monitoring sites within rehabilitated areas. Each quadrat is to include the two dominant tree species (*Callitris preissii* and *Melaleuca lanceolata*).

Monitoring of revegetation is broken into mortality counts at year 1 and 3, to assess the early success of revegetation. Infill planting will take place at year 5 if required. The 3-year survival count will provide a good indication of how the revegetation is tracking to a survival rate of a minimum of 50%. If the mortality rate at year 3 is 40% and the site is unlikely to meet the completion criteria of 50%, infill planting should take place at the 5-year mark. See Schedule 1 for an outline of the program.

A final cover assessment of the site takes place at 10 years when tree guards are removed. Sites that are deemed to meet the criteria are 'complete' and sites that do not meet the criteria receive infill planting, and another round of monitoring takes place.

See below for the full list of revegetation monitoring undertaken by RIA:

- 1 year - survival count and removal of dead plants and guards
- 3 year - survival count and removal of dead plants and guards
- 5 Year - infill planting if required
- 10 year - guard removal and cover assessment.

Weed control will be undertaken prior to planting as per the Weed Management outlined in Appendix A.

10. Schedule and Budget

A preliminary schedule is presented in Table 1, which includes seed collection, propagation, planting, and monitoring. The Rottnest Island Authority is responsible for the implementation of this Plan and will resource activities.

This project is fully funded and supported by the Rottnest Island Authority; funds will be sourced from the RIA.

ROTTNEST ISLAND AUTHORITY

Table 1: Works Schedule

	Year 0 (Plan)												Year 1 (Plant)												Year 2												Year 3												Year 4											
	2025												2026												2027												2028												2029											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Seed Collection																																																											
Propagation																																																											
Ground Disturbance form																																																											
Site Preparation - waste removal																																																											
Site Maintenance – rubbish																																																											
Weed Treatment and Assessment																																																											
Black Flag																																																											
Onion Weed																																																											
Planting of Tube Stock																																																											
Monitoring																																																											
Year 1 count																																																											
Year 3 count																																																											
Seed collection for year 5 infill (if required)																																																										
Propagation for year 5 infill (if required)																																																										
Year 5 infill																																																										
Year 10 count and guard removal																																																										
Year 5 infill Guard Removal and check (if required)																																																									

	Activity to complete
	Activity as required

ROTTNEST ISLAND AUTHORITY

	Year 5												Year 6												Year 7-8-9												Year 10											
	2030												2031												2032												2033											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D
Seed Collection																																															
Propagation																																															
Ground Disturbance form																																															
Site Preparation - waste removal																																															
Site Maintenance – rubbish																																															
Weed Treatment and Assessment																																															
Black Flag																																															
Onion Weed																																															
Planting of Tube Stock																																															
Monitoring																																															
Year 1 count																																															
Year 3 count																																															
Seed collection for year 5 infill (if required)																																															
Propagation for year 5 infill (if required)																																															
Year 5 infill and guard replacement																																															
Year 10 count and guard removal																																															
Year 5 infill Guard Removal (if required)																																															

	Activity to complete
	Activity as required

ROTTNEST ISLAND AUTHORITY

Appendix A: Weed Management for the Proposed Offset

Weed Management

SITE ASSESSMENT						
Site characteristics						
Site name	CPS 10450/1 Offset Sites and Remnant Vegetation present between CPS 9883/1 and CPS 10450/1 Clearing areas (see map below)					
DBCA District	Wadjemup / Rottnest Island		Disease Risk Area (Y/N)			N
Land size	1,859 ha		Size of weed management area			18.63 ha
Land category	National Park	**Nature Reserve**		Cons Park		Cons Reserve
	Other Reserve	State Forest		Timber Reserve		Forest Cons Area
Terrain type	**Trafficable**	Flat	**Undulating**	Steep	Rough	Non-trafficable
Site accessibility	Standard vehicle	4-wheel-drive only		All-terrain vehicle		**on-foot only**
What are the surrounding land uses?	Offset areas are surrounded by nature reserve Remnant Vegetation is within the settlement of Wadjemup with adjacent road, rail and housing.					
What stakeholders should be informed about weed management? (tick all relevant)						Neighbours
						Local Government
						Public visitors
						Local apiarists

Maps

CPS 10450/1 Offset Sites

Remnant Vegetation present between CPS 9883/1 and CPS 10450/1 Clearing areas

Weeds

Flora surveys completed in 2024 identified the following weed species:

- *Asphodelus fistulosus*
- *Cerastium glomeratum*
- *Erodium cicutarium*
- *Euphorbia peplus*
- *Galium murale*
- *Isolepis marginata*
- *Leontodon rhagadioloides*
- *Lysimachia arvensis*
- *Poaceae sp.*
- *Trachyandra divaricata*
- *Urtica urens.*

Assets	
Is weed infestation close to a sensitive area(s)? Include all assets – biodiversity, social, cultural and economic	Yes If yes, list all: • Rottnest Island Lakes • TEC 30a • Remnant vegetation is within a registered heritage site.
Are weeds providing an ecosystem service to be considered (e.g. shelter)	No

Risks	
Are there any Occupational Safety and Health risks on site?	Yes If yes, list all and complete a JSA • Snakes • Slips trips and falls.
Are there any Environmental risks on site?	No

Other Management Issues	
Are there any other management issues that need to be considered to ensure the weed management program is effective? E.g. Disease Risk Area hygiene	No

DEVELOP STRATEGIES AND MEASURES

Strategies and measures

Set measurable objectives then define actions and measures required

Refer to Notes section below for more information. Develop a list as a group and choose from list.

Objectives, Actions and Measures		Timeframe
Long-term objectives (choose two)	- Restore the site with indigenous native vegetation. - Stop site from being a source of weed infestation upstream or downstream.	7 years
Medium-term objectives	- Reduce *Trachyandra divaricata or Urtica urens* infestation area by 50%.	5 years
Short-term Objectives	- Protect populations of threatened and priority flora from declared and WONS. - No further spread of *Trachyandra divaricate or Urtica urens.* - Protect the area from new weed infestations	2 years
Strategic Actions Required		
Restoration of native vegetation	Implementation of the Parker Point Housing (East) Revegetation Plan.	
Stop site from being a source of weed infestation upstream or downstream Reduce Trachyandra divaricate or Urtica urens infestation area by 50% Protect populations of threatened and priority flora from declared and WONS or other new weeds No further spread of Trachyandra divaricate or Urtica urens.	Application of herbicides to weed infestations as per Table 1 and 2.	
Measures Required	• Change in % of weed cover. • Infestations of upstream weeds observed downstream. • Weed infestation containment within original mapped boundary.	

IMPLEMENTATION

Safety Documentation	
Has a JSA been completed? (select)	Yes – To be developed
Has a Chemical Application Plan been completed? (select)	Yes

MONITOR AND REVIEW

What steps are you required to follow once you have implemented your actions?	Establishment of photo-point monitoring points in each location. Analysis annually.

Table 1: Weed Treatment Plan

Species	Common Name	Treatment
Asphodelus fistulosus	Onion Weed	Spot Spray - Metsulfuron methyl 0.1 g / 10 L plus 100 ml oil
Cerastium glomeratum	Sticky Mouse – ear chickweed	Spot Spray - Glyphosate 100ml / 10L and Pulse
Erodium cicutarium	Redstem Stork's – Bill	Broadleaf herbicide like MCPA or Spot Spray - Glyphosate 100ml / 10L and Pulse
Euphorbia peplus	Spurge	Spot Spray - Metsulfuron methyl 0.2 g / 15L and Pulse 20ml / 10L
Galium murale	Goosegrass	Broadleaf herbicide like MCPA or Spot Spray - Glyphosate 100ml / 10L and Pulse
Isolepis marginata	Coarse club rush	Spot Spray - Glyphosate 100ml / 10L and Pulse
Leontodon rhagadioloides	Cretan Weed	Broadleaf herbicide like MCPA or Spot Spray - Glyphosate 100ml / 10L and Pulse
Lysimachia arvensis	Scarket pimpernel	Spot Spray - Glyphosate 100ml / 10L and Pulse
Poaceae sp.	Poas	Spot Spray - Glyphosate 100ml / 10L and Pulse
Trachyandra divaricata	Dune Onion weed	Spot Spray - Glyphosate 100ml / 10L and Pulse
Urtica urens	Stinging nettle	Spot Spray - Glyphosate 100ml / 10L and Pulse

Table 2: Annual Program Timing

Species	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Asphodelus fistulosus							x	x	x	x	x	x
Cerastium glomeratum					x	x	x					
Erodium cicutarium						x	x	x				
Euphorbia peplus						x	x	x	x			
Galium murale							x	x	x			
Isolepis marginata					x	x	x	x	x			
Leontodon rhagadioloides								x	x	x		
Lysimachia arvensis	x	x	x						x	x	x	x
Poaceae sp.								x	x	x	x	x
Trachyandra divaricata						x	x	x				
Urtica Urens				x	x	x	x	x	x	x		

ATTACHMENT 1 – TECHNICAL MEMORANDUM – SCP30a THREATENED ECOLOGICAL COMMUNITY ASSESSMENT – VARIOUS AREAS, ROTTNEST ISLAND (EMERGE ASSOCIATES, 2024)

TECHNICAL MEMORANDUM

SCP30a Threatened Ecological Community Assessment
Various Areas, Rottnest Island

PROJECT NUMBER	EP23-032(07)	**DOC. NUMBER**	EP23-032(07)—010 SKP
PROJECT NAME	Rottnest Island SCP30a TEC Assessment	**CLIENT**	Rottnest Island Authority
AUTHOR	SKP	**REVIEWER**	RAW
VERSION	1	**DATE**	27/09/2024

1. INTRODUCTION

Emerge Associates (Emerge) were engaged by the Rottnest Island Authority to undertake a vegetation survey within three areas on Rottnest Island (referred to herein as 'survey area 1-3' as shown in **Figure 1**). The survey areas collectively comprise 26.14 ha.

The purpose of the survey was to determine whether the '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands, Swan Coastal Plain' threatened ecological community (TEC) (SCP30a) occurs within the survey areas. SCP30a TEC is listed as 'critically endangered' under the *Biodiversity Conservation Act 2016* (BC Act) and is synonymous with floristic community type (FCT) 30a, as described by (Gibson *et al.* 1994).

The scope of work was to undertake flora and vegetation survey in order to identify the extent and condition of the SCP30a TEC within the survey areas. Whilst a 'detailed' flora and vegetation assessment was not required, this assessment undertook sampling in order to identify the SCP30a TEC to a 'detailed' standard in accordance with the Environmental Protection Authority's (EPA's) technical guidance (EPA 2016).

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

- A field survey to undertake quadrat sampling, record vegetation condition and map the extent of the TEC within the survey area.
- Documentation of the desktop assessment, methodology, field surveys and results into a technical memorandum.

2. METHODS

2.1. Field survey

Two botanists from Emerge visited the survey areas on 26 August 2024 to conduct the field survey.

The survey areas were traversed on foot and detailed sampling of the vegetation was undertaken using non-permanent 10 x 10 m quadrats within areas considered likely to represent SCP30a TEC. The quadrats were established using fence droppers bounded by measuring tape. The position[1] of each sample was recorded with a hand-held GPS receiver (±5 m accuracy).

[1] The north-west corner was recorded.

The data recorded within each sample included:

- site details (site name, site number, observers, date, location)
- environmental information (slope, aspect, bare-ground, rock outcropping, soil type and colour, litter layer, topographical position, time since last fire event)
- biological information (species, plant specimens, vegetation structure, vegetation condition, 'foliage projective cover', and disturbance).

Plant specimens were collected where the identity of flora required further confirmation. Photographic images and notes were recorded as required. Flora was classified as native if indigenous to the IBRA region in which the site occurs. Non-native flora is denoted by '*' in text and raw data.

Vegetation condition was mapped on aerial photography based on notes recorded during the field survey to define areas with differing condition and using the EPA (2016) scale (**Table 1**).

Table 1: Vegetation condition scale applied during the field assessment

Category	Definition (EPA 2016)
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks
Very good	Vegetation structure altered, obvious signs of disturbance. 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, 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. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, 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 and shrubs.

2.2. Analysis and data preparation

2.2.1. Flora and vegetation

Flora were identified through comparison with named material and through the use of taxonomic keys. Plant specimens collected during the field survey were dried, pressed and named in accordance with requirements of the (Western Australian Herbarium 2024).

The vegetation units within the site were identified from the 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 vegetation units were mapped on aerial photography during the field survey and boundaries were interpreted from aerial photography and notes taken in the field.

2.2.2. Floristic community type assignment

The identified vegetation units were compared to the regional 'floristic community type' (FCT) dataset *A floristic survey of the southern Swan Coastal Plain* (Gibson *et al.* 1994). Each sample was compared to Gibson *et al.* (1994) separately to limit the influence of spatial correlation when assigning an FCT.

Sample data (presence/absence) was first reconciled with Gibson *et al.* (1994) by standardising the names of taxa with those used in the earlier study. This was necessary due to changes in nomenclature in the intervening period. Taxa that were only identified to genus level were excluded, while some infra-species that have been identified since 1994 were reduced to species level. The combined dataset was then imported into the statistical analysis package PRIMER v6 (Clarke and Gorley 2006).

A resemblance matrix was generated using the Bray-Curtis distance measure which provided the percentage similarity between all pairs of samples. A cluster analysis was then performed using the resemblance matrix and hierarchical agglomerative clustering, to produce a dendrogram.

Where a sample tended to cluster with a grouping of different FCTs, the resemblance matrix was examined. Ultimately a combination of cluster analysis, resemblance matrix and contextual information relating to the soils, landforms and known FCTs within the region was considered in the final determination of an FCT.

2.2.3. Threatened and priority ecological community

Areas of native vegetation potentially representing SCP30a TEC were assessed against key diagnostic characteristics (DPaW 2014; DBCA 2023b, a).

3. RESULTS

3.1. Identification of SCP30a TEC

A total of 36 species (26 native and 10 weed taxa) were recorded across the survey areas. A list of the flora species recorded is provided in **Appendix A** and the raw sample data is provided in **Appendix B**.

All three survey areas contained vegetation described as comprising vegetation unit **MlCp** - low open to closed woodland or shrubland of *Melaleuca lanceolata* and *Callitris preissii* over open to closed forbland of *Acanthocarpus preissii, Rhagodia baccata* subsp. *dioica, Poa poiformis* and *Austrostipa flavescens* on sand, often with underlying and/or outcropping limestone (**Figure 1**). Representative photographs of the **MlCp** vegetation in each area are provided in **Plate 1** to **Plate 9**.

The **MlCp** vegetation represents SCP30a TEC as it contains key indicator species *Callitris preissii* and/or *Melaleuca lanceolata* and meets the TEC description. The survey areas and surrounding areas occur on calcareous sands of the Quindalup Dunes, as is consistent with the TEC. The surrounding areas also contained similar vegetation dominated by *Melaleuca lanceolata* and *Callitris preissii.*

The central portion of survey area 3 was not mapped as comprising **MlCp** as it was dominated by *Acacia rostellifera* shrubs (**Plate 10**). Similarly, one corner of survey area 2 contained planted **Eucalyptus utilis* and was not mapped as **MlCp**. Tracks and other cleared areas were also not mapped as comprising **MlCp** (**Figure 1**).

The extent of the SCP30a TEC within each survey area is provided in **Table 2**.

Table 2: Areas of SCP30a TEC within each survey area

	Size (ha)			
	Survey area 1	Survey area 2	Survey area 3	TOTAL
SCP30a TEC	2.35	3.76	16.69	**22.80**
Not SCP30a TEC	0.07	0.26	3.01	**3.34**
TOTAL	**2.42**	**4.02**	**19.69**	**26.14**

The floristic analysis identified that all samples either clustered with or showed high similarity to FCT 30a. The most similar Gibson *et al.* (1994) samples and FCTs are shown in **Table 3**.

The relevant portions of the cluster dendrograms are provided in **Appendix C**.

Table 3: Vegetation unit and likely FCT represented within the site for each sample

Vegetation unit	Sample	Most similar (Gibson *et al.* 1994) site	Similarity (%)	Determined floristic community type (FCT)
MlCp	Q1	GARDEN-1 (FCT 30a)	35	FCT 30a – '*Callitris preissii* (or *Melaleuca lanceolata*) forests or woodlands'
		GARDEN-3 (FCT 30a)	35	
	Q2	SEAB-1 (FCT 30c)	23	
	Q2^	LESCH-3 (FCT 30b)	30	
		LESCH-4 (FCT 30b)	30	
		GARDEN-3 (FCT 30a)	26	
	Q3^	GARDEN-4 (FCT 30a)	30	
		GARDEN-1 (FCT 30a)	28	
	Q4	GARDEN-1 (FCT 30a)	42	
		GARDEN-3 (FCT 30a)	42	
	Q5	GARDEN-1 (FCT 30a)	36	
		GARDEN-3 (FCT 30a)	36	

^ denotes samples individual similarity to Gibson et al. (1994) dataset sites rather than a cluster within the dendrogram

Plate 1: SCP30a TEC vegetation in 'good' condition in survey area 1

Plate 2: SCP 30a TEC vegetation in 'good - very good' condition in survey area 1

Plate 3: SCP30a TEC vegetation in 'degraded' condition in survey area 2

Plate 4: SCP30a TEC vegetation in 'degraded - good' condition in survey area 2

Plate 5: SCP30a TEC vegetation in 'good' condition in survey area 2

Plate 6: SCP30a TEC vegetation in 'degraded - good' condition in survey area 3

Plate 7: SCP30a TEC vegetation in 'good' condition in survey area 3

Plate 8: SCP30a TEC vegetation in 'good to very good' condition in survey area 3

Plate 9: SCP30a TEC vegetation in 'very good' condition in survey area 3

Plate 10: Areas not mapped as the SCP30a TEC vegetation in survey area 3 (Acacia rostellifera shrublands)

3.1.1. Vegetation condition

The extent of the SCP30a TEC vegetation by condition category is detailed in **Table 4** and shown in **Figure 1**.

Table 4: Vegetation condition categories within the survey areas

Condition category (EPA 2016)	Size (ha)		
	Survey area 1	Survey area 2	Survey area 3
Pristine	0	0	0
Excellent	0	0	0
Very good	0	0	5.80
Good – very good	0.65	0	4.49
Good	1.70	1.48	4.60
Degraded - good	0	0.47	1.80
Degraded	0	1.81	0
Completely degraded	0	0	0
TOTAL	**2.35**	**3.76**	**16.69**

4. Discussion

4.1. Identification of areas of SCP30a TEC

The DBCA database shows that two occurrences of the '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands' TEC occur close to the site. Floristic analysis indicated samples Q1 to Q5 all showed high similarity to FCT 30a. Sample Q2 clustered to FCT 30c which is not an appropriate FCT for Rottnest Island and Sample Q3 clustered to a large group of FCTs with low similarity. Both of these samples showed high individual similarity to Gibson *et al.* (1994) assigned to FCT 30a.

Almost all samples contained *Callitris preissii* which is a key indicator for the TEC (DPaW 2014; DBCA 2023a). The codominant canopy species *Melaleuca lanceolata*, understorey species *Acanthocarpus preissii* and *Rhagodia baccata* and weed species **Galium murale* and *Trachyandra divaricata* present in these quadrats are also listed as common and typical species within the TEC (DPaW 2014).

C. preissii was historically abundant on Rottnest Island but its extent has been reduced and the remainder is generally found as scattered occurrences amongst *Melaleuca lanceolata* closed woodland. Some of the *Callitris preissii* and *Melaleuca lanceolata* individuals in the survey area have been planted but are still considered to contribute to the TEC as all three survey areas contains a mixture of mature plants likely to comprise natural populations as well as planted individuals.

4.2. Vegetation condition

The majority of the SCP30a TEC vegetation across all three survey areas was mapped as being in 'good', 'good to very good' or 'very good' condition due to the presence of intact vegetation strata (low trees, shrubs and herbs), high native species cover and low to moderate weed cover. FCT 30a has a relatively low mean species richness (21.1 species per quadrat) (Gibson *et al.* 1994). The samples within the survey areas ranged from 12 to 22 species per quadrat.

Vegetation in portions of the western end of survey area 3 and the north-western portion of survey area 2 had higher weed cover and were mapped as being in 'degraded to good' condition.

Vegetation in the western portion of survey area 2 comprised a low closed woodland of *Melaleuca lanceolata* over dense weeds with limited native understorey and was mapped as being in degraded condition (**Plate 3**).

5. CONCLUSIONS

The '*Callitris preissii* (or *Melaleuca lanceolata*) forests and woodlands' TEC occurs within all three survey areas, occupying a total of 22.8 ha (87% of the total survey area) and ranging from 'degraded' to 'very good' condition.

6. REFERENCES

6.1. General references

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6.2. Online references

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Figures

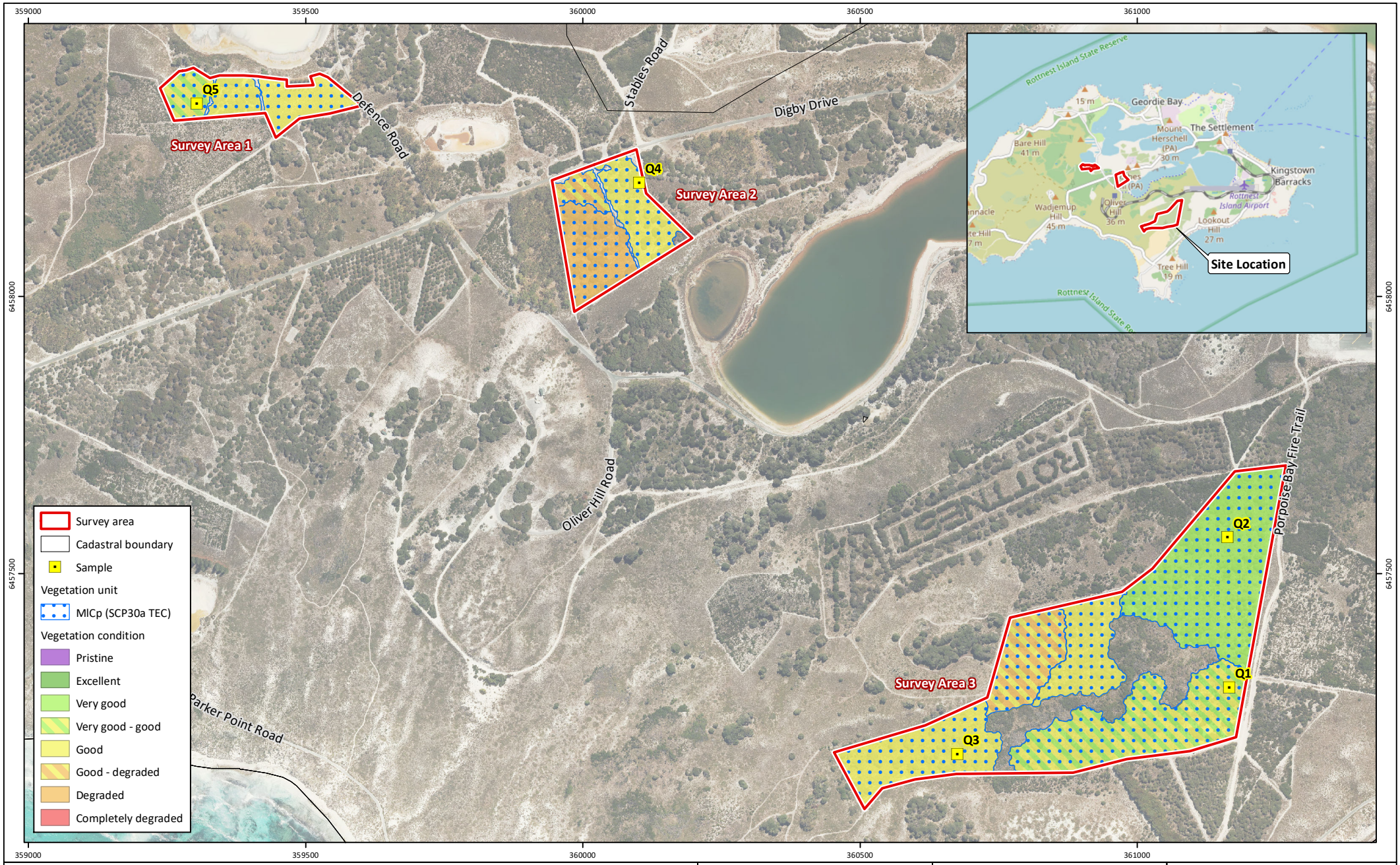

Figure 1: SCP30a TEC Areas and Condition

Project: SCP30a TEC Survey

Client: Rottnest Island Authority

Plan Number:
EP23-032(07)--F25a

Drawn:	GAR
Date:	13/09/2024
Checked:	SKP
Approved:	SKP
Date:	13/09/2024

N

0 90 180 270

Metres

Scale: 1:9,000@A4

GDA2020 MGA Zone 50

emerge ASSOCIATES

While Emerge Associates makes every attempt to ensure the accuracy and completeness of data, Emerge accepts no responsibility for externally sourced data used
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Appendix A

Species List

Family	Status	Species
Araliaceae		
		Hydrocotyle diantha
		Hydrocotyle hispidula
Asparagaceae		
		Acanthocarpus preissii
Asphodelaceae		
	*	*Asphodelus fistulosus*
	*	*Trachyandra divaricata*
Asteraceae		
	*	*Leontodon rhagadioloides*
		Senecio pinnatifolius var. *maritimus*
Caryophyllaceae		
	*	*Cerastium glomeratum*
Centrolepidaceae		
		Centrolepis polygyna
Chenopodiaceae		
		Rhagodia baccata subsp. *dioica*
Colchicaceae		
		Wurmbea monantha
Crassulaceae		
		Crassula colorata
		Crassula decumbens
Cupressaceae		
		Callitris preissii
Cyperaceae		
		Carex thecata
		Lepidosperma ?pubisquameum
Euphorbiaceae		
	*	*Euphorbia peplus*
Fabaceae		
		Acacia rostellifera
Haemodoraceae		
		Conostylis candicans subsp. *calcicola*
Juncaginaceae		
		Triglochin trichophora
Malvaceae		
		Guichenotia ledifolia
		Thomasia cognata
Montiaceae		
		Calandrinia brevipedata
Myrtaceae		
	Pl	*Eucalyptus gomphocephala*
	*, Pl	*Eucalyptus utilis*
		Melaleuca lanceolata
Orchidaceae		
		Caladenia latifolia
		Cyrtostylis huegelii
Phyllanthaceae		

		Poranthera drummondii
Poaceae		
		Austrostipa flavescens
		Poa poiformis
	*	Poaceae sp.
Primulaceae		
	*	*Lysimachia arvensis*
Ranunculaceae		
		Clematis linearifolia
Rubiaceae		
	*	*Galium murale*
Urticaceae		
		Parietaria cardiostegia
	*	*Urtica urens*

*=non-native, Pl=planted

Appendix B

Raw survey data

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q1

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q1: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	361166.1865	NW corner northing:	6457295.214
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	moderate - weeds, plantings
Soil type/texture	sand/	Bare ground (%):	15
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	35% (branches,twigs,logs)	Vegetation condition:	good-very good

Vegetation Sample Data
Rottnest TEC Assessment

Sample Name: Q1

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q1: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia rostellifera	0.5
	Acanthocarpus preissii	30
	Austrostipa flavescens	2
	Calandrinia brevipedata	3
	Callitris preissii	10
	Conostylis candicans subsp. calcicola	1
	Crassula decumbens	0.5
	Cyrtostylis huegelii	opp
*	*Euphorbia peplus*	1
*	*Galium murale*	0.5
	Guichenotia ledifolia	opp
	Hydrocotyle diantha	0.5
	Hydrocotyle hispidula	0.5
*	*Leontodon rhagadioloides*	0.5
	Melaleuca lanceolata	10
	Parietaria cardiostegia	1
	Poa poiformis	2
	Poranthera drummondii	0.5
	Rhagodia baccata supsp. dioica	0.5
	Senecio pinnatifolius var. maritimus	0.5
*	*Trachyandra divaricata*	1
	Triglochin trichophora	0.5
*	*Urtica nitens*	1
	Wurmbea monantha	0.5

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q2

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q2: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	361162.6061	NW corner northing:	6457565.378
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	damp	Landform:	flat
Time since fire:	no evidence	Disturbance:	moderate - weeds
Soil type/texture	sand/	Bare ground (%):	5
Rocks (%) and type:	No rocks	Soil colour:	grey/brown
Litter:	20% (branches,twigs,)	Vegetation condition:	very good

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q2

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q2: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acanthocarpus preissii	20
	Acacia rostellifera	2
	Caladenia latifolia	0.5
	Calandrinia brevipedata	5
	Callitris preissii	opp
	Conostylis candicans subsp. calcicola	5
	Crassula colorata	0.5
	Crassula decumbens	0.5
	Cyrtostylis huegelii	0.5
	Guichenotia ledifolia	10
	Hydrocotyle diantha	10
	Hydrocotyle hispidula	0.5
	Melaleuca lanceolata	10
	Parietaria cardiostegia	1
	Poa poiformis	8
	Poranthera drummondii	1
	Senecio pinnatifolius var. maritimus	0.5
	Triglochin trichophora	1
	Wurmbea monantha	0.5

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q3

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q3: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	360675.2381	NW corner northing:	6457174.984
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	lower slope
Time since fire:	no evidence	Disturbance:	moderate - weeds
Soil type/texture	sand/	Bare ground (%):	1
Rocks (%) and type:	No rocks	Soil colour:	brown/
Litter:	5% (branches,,)	Vegetation condition:	good-very good

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q3

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q3: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acanthocarpus preissii	10
*	*Isolepis marginata*	0.5
	Clematis linearifolia	0.5
	Crassula decumbens	0.5
	Cyrtostylis huegelii	0.5
	Hydrocotyle diantha	2
*	*Leontodon rhagadioloides*	0.5
	Melaleuca lanceolata	5
	Parietaria cardiostegia	7
	Poa poiformis	0.5
	Rhagodia baccata supsp. dioica	70
*	*Trachyandra divaricata*	3

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q4

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q4: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	360102.1236	NW corner northing:	6458204.867
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	upper slope
Time since fire:	no evidence	Disturbance:	moderate - weeds
Soil type/texture	sand/	Bare ground (%):	2
Rocks (%) and type:	2%, limestone	Soil colour:	brown/
Litter:	5% (branches,,)	Vegetation condition:	good

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q4

Project no.: EP23-032

Date: 26/08/2024 **Status** Non-permanent

Author: SKP,TAA Q4: Page 2 of 2

Species Data

* denotes non-native species

Status	Confirmed name	Cover (%)
	Acanthocarpus preissii	20
*	*Asphodelus fistulosus*	0.5
	Callitris preissii	2
	Carex thecata	0.5
	Crassula decumbens	0.5
	Cyrtostylis huegelii	0.5
	Dichondra repens	opp
*	*Erodium cicutarium*	opp
*	*Euphorbia peplus*	15
*	*Galium murale*	8
	Guichenotia ledifolia	30
	Hydrocotyle diantha	0.5
*	*Lysimachia arvensis*	0.5
	Melaleuca lanceolata	5
	Parietaria cardiostegia	0.5
	Poa poiformis	2
*	*Poaceae sp.*	1
	Poranthera drummondii	0.5
*	*Trachyandra divaricata*	1
	Triglochin trichophora	0.5
*, Pl	*Eucalyptus utilis*	opp

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q5

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q5: Page 1 of 2

Quadrat and landform details

Sample type:	quadrat	Size:	10 m x 10 m
NW corner easting:	359303.8436	NW corner northing:	6458348.021
Altitude (m):	0	Geographic datum/zone:	GDA94/Zone 50
Soil water content:	slightly damp	Landform:	lower slope
Time since fire:	no evidence	Disturbance:	moderate - weeds, plantings
Soil type/texture	sand/	Bare ground (%):	1
Rocks (%) and type:	1%, limestone	Soil colour:	brown/
Litter:	5% (branches,,)	Vegetation condition:	good-very good

Vegetation Sample Data

Rottnest TEC Assessment

Sample Name: Q5

Project no.: EP23-032
Date: 26/08/2024 **Status** Non-permanent
Author: SKP,TAA Q5: Page 2 of 2

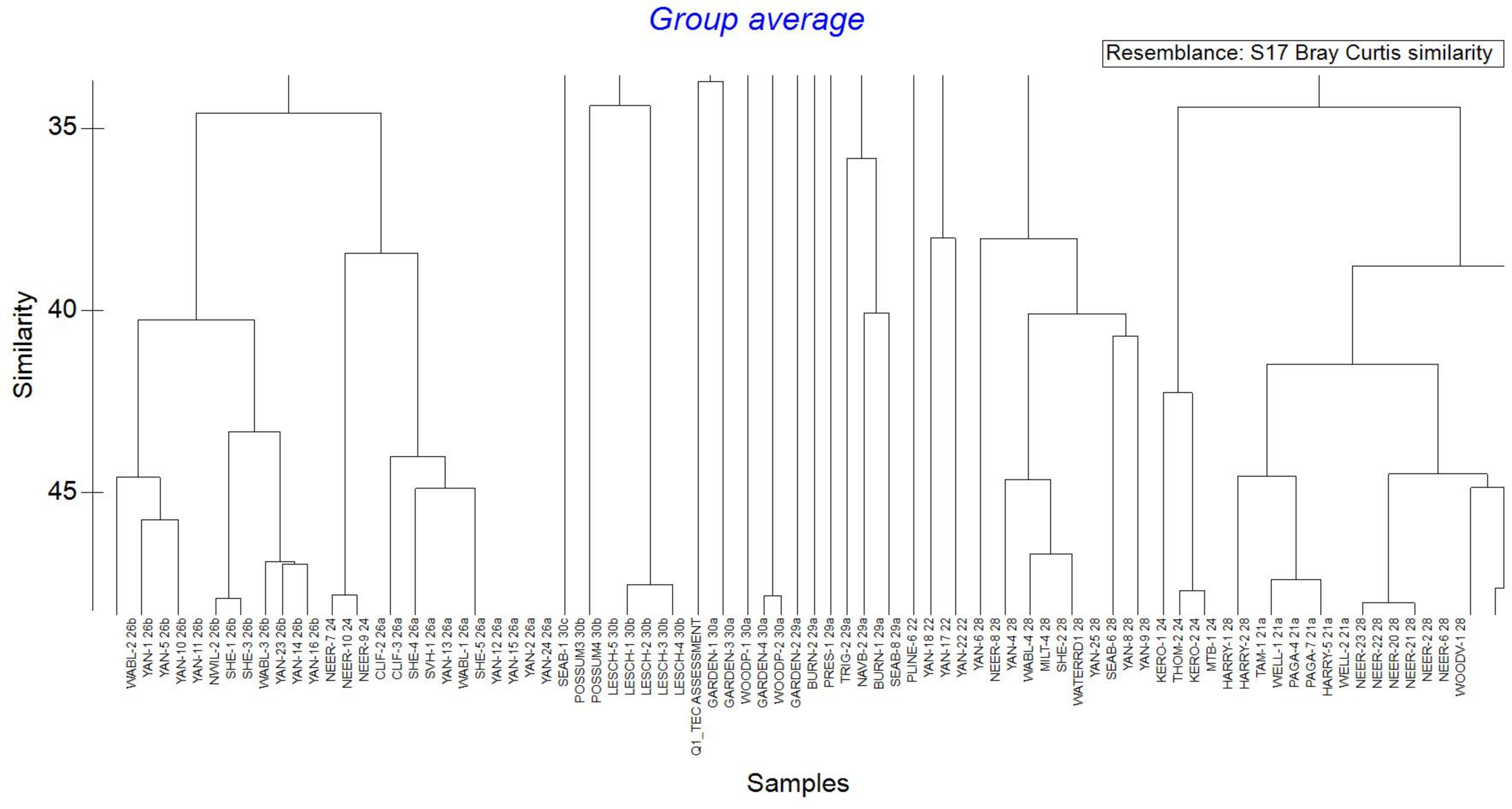
Species Data

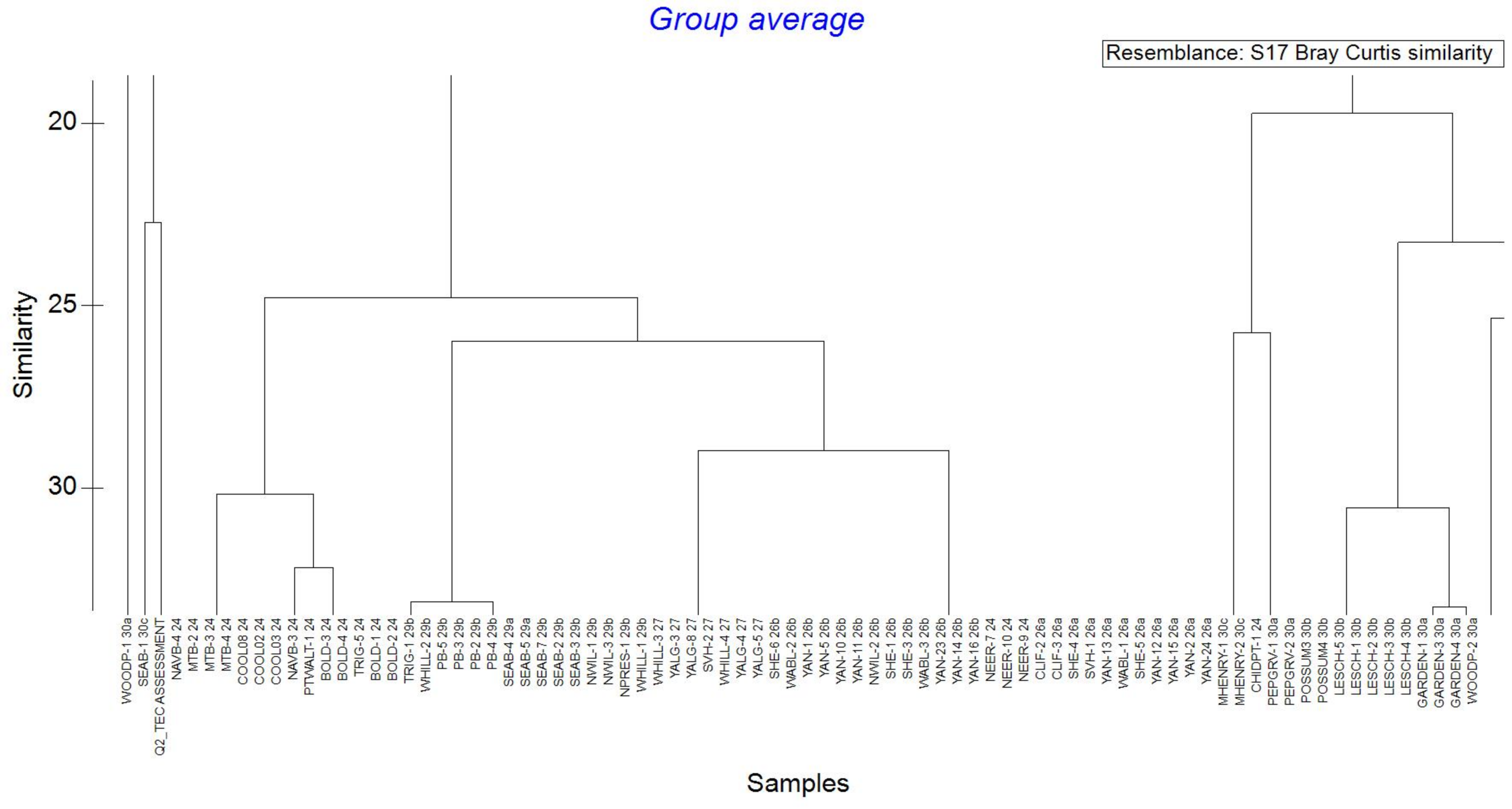
* denotes non-native species

Status	Confirmed name	Cover (%)
	Acacia rostellifera	3
	Acanthocarpus preissii	20
	Caladenia latifolia	
	Callitris preissii	10
*	*Cerastium glomeratum*	0.5
	Crassula decumbens	0.5
	Cyrtostylis huegelii	opp
*	*Euphorbia peplus*	0.5
*	*Galium murale*	20
	Guichenotia ledifolia	20
	Hydrocotyle diantha	1
	Hydrocotyle hispidula	0.5
	Lepidosperma ?pubisquameum	10
*	*Lysimachia arvensis*	0.5
	Melaleuca lanceolata	10
	Poa poiformis	10
	Poranthera drummondii	0.5
	Rhagodia baccata supsp. dioica	opp
	Thomasia cognata	0.5
*	*Trachyandra divaricata*	1
	Triglochin trichophora	opp
*, Pl	*Eucalyptus utilis*	opp

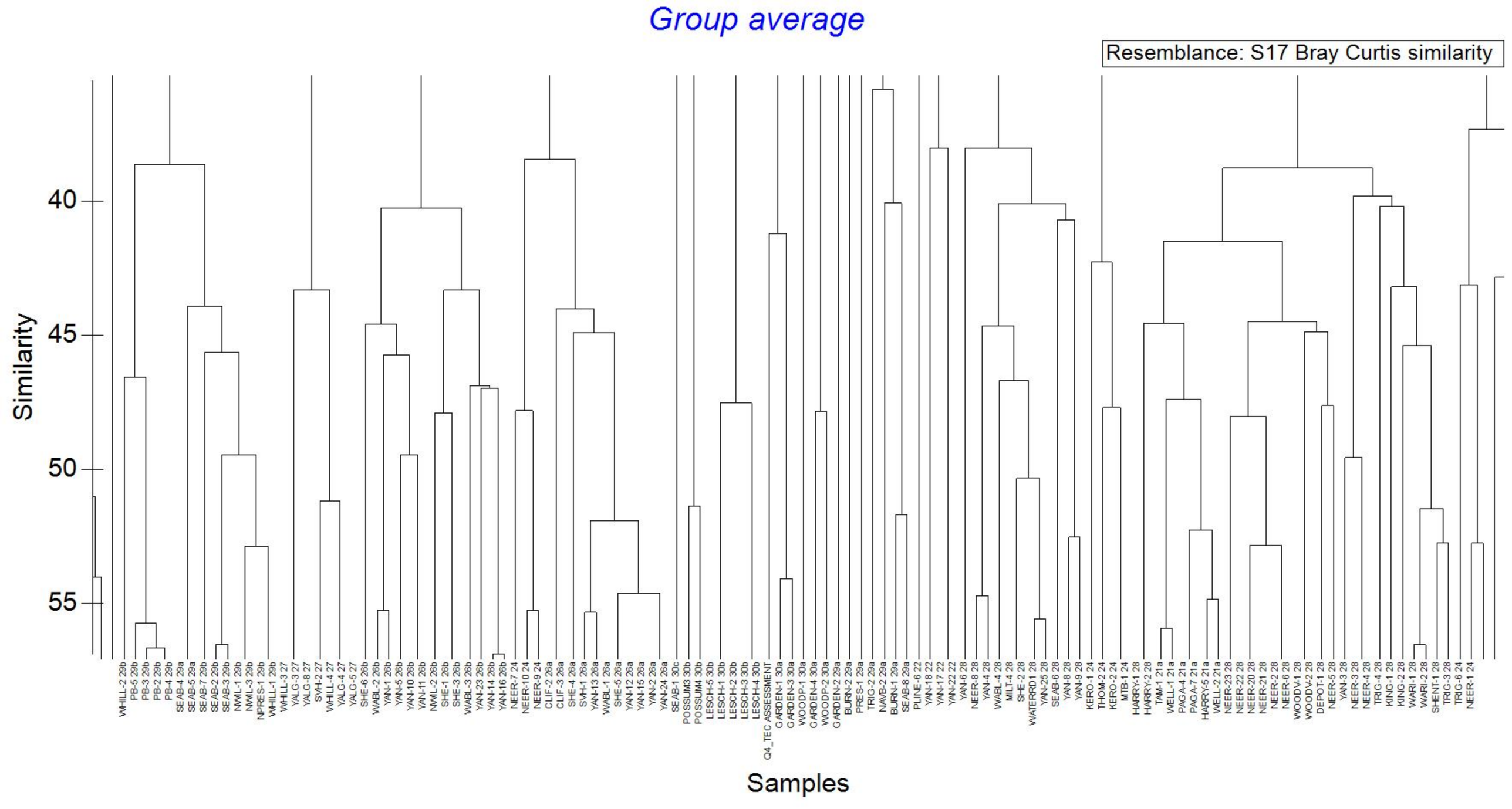
Appendix C

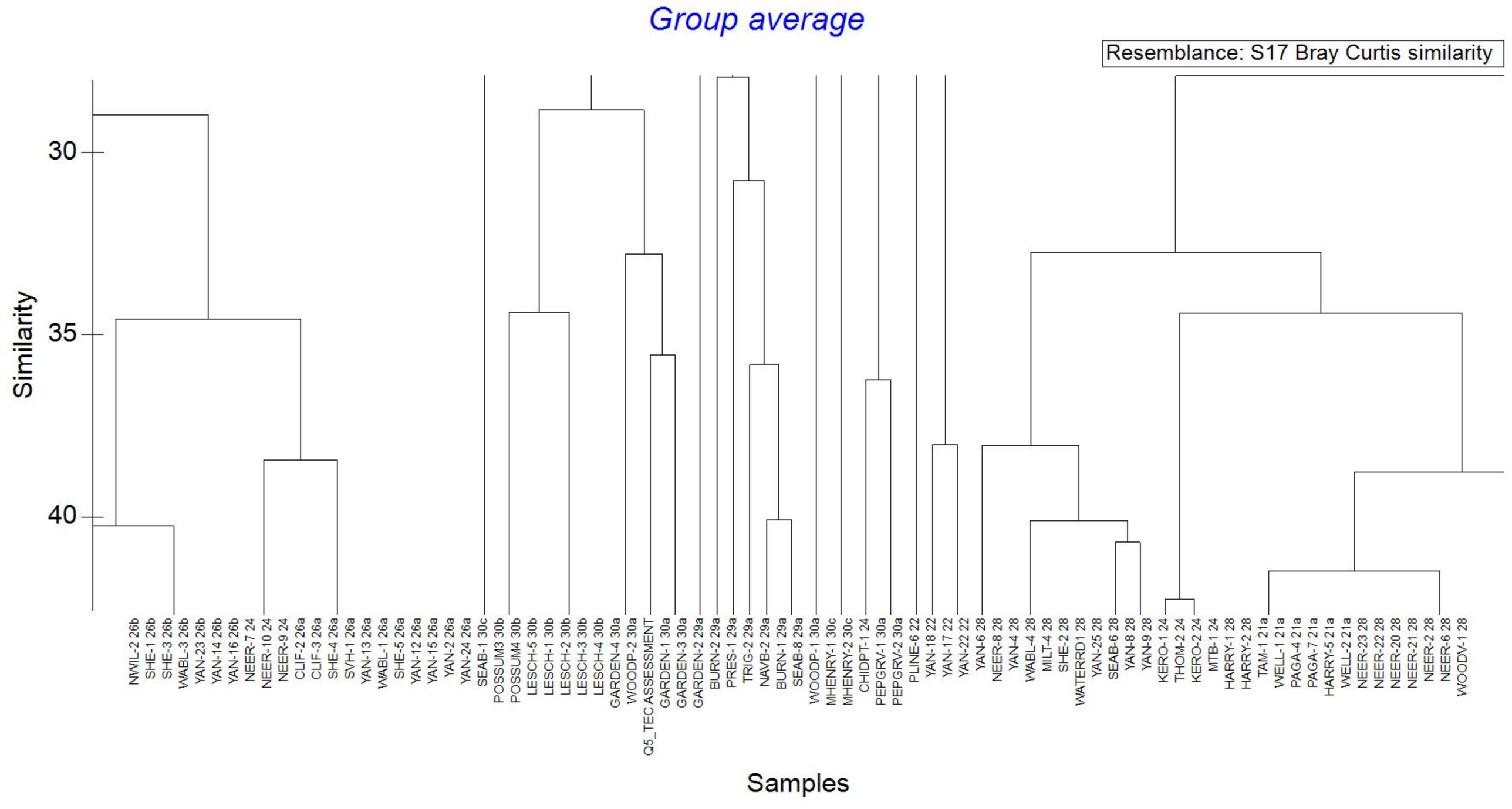
Cluster Dendrograms


Group average
Resemblance: S17 Bray Curtis similarity
Similarity
35
40
45
WABL-2 26b
YAN-1 26b
YAN-5 26b
YAN-10 26b
YAN-11 26b
NWIL-2 26b
SHE-1 26b
SHE-3 26b
WABL-3 26b
YAN-23 26b
YAN-14 26b
YAN-16 26b
NEER-7 24
NEER-10 24
NEER-9 24
CLIF-2 26a
CLIF-3 26a
SHE-4 26a
SVH-1 26a
YAN-13 26a
WABL-1 26a
SHE-5 26a
YAN-12 26a
YAN-15 26a
YAN-2 26a
YAN-24 26a
SEAB-1 30c
POSSUM3 30b
POSSUM4 30b
LESCH-5 30b
LESCH-1 30b
LESCH-2 30b
LESCH-3 30b
LESCH-4 30b
Q1_TEC ASSESSMENT
GARDEN-1 30a
GARDEN-3 30a
WOODP-1 30a
GARDEN-4 30a
WOODP-2 30a
GARDEN-2 29a
BURN-2 29a
PRES-1 29a
TRIG-2 29a
NAVB-2 29a
BURN-1 29a
SEAB-8 29a
PLINE-6 22
YAN-18 22
YAN-17 22
YAN-22 22
YAN-6 28
NEER-8 28
YAN-4 28
WABL-4 28
MILT-4 28
SHE-2 28
WATERRD1 28
YAN-25 28
SEAB-6 28
YAN-8 28
YAN-9 28
KERO-1 24
THOM-2 24
KERO-2 24
MTB-1 24
HARRY-1 28
HARRY-2 28
TAM-1 21a
WELL-1 21a
PAGA-4 21a
PAGA-7 21a
HARRY-5 21a
WELL-2 21a
NEER-23 28
NEER-22 28
NEER-20 28
NEER-21 28
NEER-2 28
NEER-6 28
WOODV-1 28
Samples


Group average
Resemblance: S17 Bray Curtis similarity
Similarity
20
25
30
Samples
WOODP-1 30a
SEAB-1 30c
Q2_TEC ASSESSMENT
NAVB-4 24
MTB-2 24
MTB-3 24
MTB-4 24
COOL08 24
COOL02 24
COOL03 24
NAVB-3 24
PTWALT-1 24
BOLD-3 24
BOLD-4 24
TRIG-5 24
BOLD-1 24
BOLD-2 24
TRIG-1 29b
WHILL-2 29b
PB-5 29b
PB-3 29b
PB-2 29b
PB-4 29b
SEAB-4 29a
SEAB-5 29a
SEAB-7 29b
SEAB-2 29b
SEAB-3 29b
NWIL-1 29b
NWIL-3 29b
NPRES-1 29b
WHILL-1 29b
WHILL-3 27
YALG-3 27
YALG-8 27
SVH-2 27
WHILL-4 27
YALG-4 27
YALG-5 27
SHE-6 26b
WABL-2 26b
YAN-1 26b
YAN-5 26b
YAN-10 26b
YAN-11 26b
NWIL-2 26b
SHE-1 26b
SHE-3 26b
WABL-3 26b
YAN-23 26b
YAN-14 26b
YAN-16 26b
NEER-7 24
NEER-10 24
NEER-9 24
CLIF-2 26a
CLIF-3 26a
SHE-4 26a
SVH-1 26a
YAN-13 26a
WABL-1 26a
SHE-5 26a
YAN-12 26a
YAN-15 26a
YAN-2 26a
YAN-24 26a
MHENRY-1 30c
MHENRY-2 30c
CHIDPT-1 24
PEPGRV-1 30a
PEPGRV-2 30a
POSSUM3 30b
POSSUM4 30b
LESCH-5 30b
LESCH-1 30b
LESCH-2 30b
LESCH-3 30b
LESCH-4 30b
GARDEN-1 30a
GARDEN-3 30a
GARDEN-4 30a
WOODP-2 30a

Group average
Resemblance: S17 Bray Curtis similarity
Similarity
2
4
6
Q3_TEC ASSESSMENT
WOODP-1 30a
NAVB-4 24
MTB-2 24
MTB-3 24
MTB-4 24
COOL08 24
COOL02 24
COOL03 24
NAVB-3 24
PTWALT-1 24
BOLD-3 24
BOLD-4 24
TRIG-5 24
BOLD-1 24
BOLD-2 24
TRIG-1 29b
WHILL-2 29b
PB-5 29b
PB-3 29b
PB-2 29b
PB-4 29b
SEAB-4 29a
SEAB-5 29a
SEAB-7 29b
SEAB-2 29b
SEAB-3 29b
NWIL-1 29b
NWIL-3 29b
NPRES-1 29b
WHILL-1 29b
WHILL-3 27
YALG-3 27
YALG-8 27
SVH-2 27
WHILL-4 27
YALG-4 27
YALG-5 27
SHE-6 26b
Samples


Group average
Resemblance: S17 Bray Curtis similarity
Similarity
40
45
50
55
Samples
WHILL-2 29b
PB-5 29b
PB-3 29b
PB-2 29b
PB-4 29b
SEAB-4 29a
SEAB-5 29a
SEAB-7 29b
SEAB-2 29b
SEAB-3 29b
NWIL-1 29b
NWIL-3 29b
NPRES-1 29b
WHILL-1 29b
WHILL-3 27
YALG-3 27
YALG-8 27
SVH-2 27
WHILL-4 27
YALG-4 27
YALG-5 27
SHE-6 26b
WABL-2 26b
YAN-1 26b
YAN-5 26b
YAN-10 26b
YAN-11 26b
NWIL-2 26b
SHE-1 26b
SHE-3 26b
WABL-3 26b
YAN-23 26b
YAN-14 26b
YAN-16 26b
NEER-7 24
NEER-10 24
NEER-9 24
CLIF-2 26a
CLIF-3 26a
SHE-4 26a
SVH-1 26a
YAN-13 26a
WABL-1 26a
SHE-5 26a
YAN-12 26a
YAN-15 26a
YAN-2 26a
YAN-24 26a
SEAB-1 30c
POSSUM3 30b
POSSUM4 30b
LESCH-5 30b
LESCH-1 30b
LESCH-2 30b
LESCH-3 30b
LESCH-4 30b
Q4_TEC ASSESSMENT
GARDEN-1 30a
GARDEN-3 30a
WOODP-1 30a
GARDEN-4 30a
WOODP-2 30a
GARDEN-2 29a
BURN-2 29a
PRES-1 29a
TRIG-2 29a
NAVB-2 29a
BURN-1 29a
SEAB-8 29a
PLINE-6 22
YAN-18 22
YAN-17 22
YAN-22 22
YAN-6 28
NEER-8 28
YAN-4 28
WABL-4 28
MILT-4 28
SHE-2 28
WATERRD1 28
YAN-25 28
SEAB-6 28
YAN-8 28
YAN-9 28
KERO-1 24
THOM-2 24
KERO-2 24
MTB-1 24
HARRY-1 28
HARRY-2 28
TAM-1 21a
WELL-1 21a
PAGA-4 21a
PAGA-7 21a
HARRY-5 21a
WELL-2 21a
NEER-23 28
NEER-22 28
NEER-20 28
NEER-21 28
NEER-2 28
NEER-6 28
WOODV-1 28
WOODV-2 28
DEPOT-1 28
NEER-5 28
YAN-3 28
NEER-3 28
NEER-4 28
TRIG-4 28
KING-1 28
KING-2 28
WARI-1 28
WARI-2 28
SHENT-1 28
TRIG-3 28
TRIG-6 24
NEER-1 24


Group average
Resemblance: S17 Bray Curtis similarity
Similarity
30
35
40
NWIL-2 26b
SHE-1 26b
SHE-3 26b
WABL-3 26b
YAN-23 26b
YAN-14 26b
YAN-16 26b
NEER-7 24
NEER-10 24
NEER-9 24
CLIF-2 26a
CLIF-3 26a
SHE-4 26a
SVH-1 26a
YAN-13 26a
WABL-1 26a
SHE-5 26a
YAN-12 26a
YAN-15 26a
YAN-2 26a
YAN-24 26a
SEAB-1 30c
POSSUM3 30b
POSSUM4 30b
LESCH-5 30b
LESCH-1 30b
LESCH-2 30b
LESCH-3 30b
LESCH-4 30b
GARDEN-4 30a
WOODP-2 30a
Q5_TEC ASSESSMENT
GARDEN-1 30a
GARDEN-3 30a
GARDEN-2 29a
BURN-2 29a
PRES-1 29a
TRIG-2 29a
NAVB-2 29a
BURN-1 29a
SEAB-8 29a
WOODP-1 30a
MHENRY-1 30c
MHENRY-2 30c
CHIDPT-1 24
PEPGRV-1 30a
PEPGRV-2 30a
PLINE-6 22
YAN-18 22
YAN-17 22
YAN-22 22
YAN-6 28
NEER-8 28
YAN-4 28
WABL-4 28
MILT-4 28
SHE-2 28
WATERRD1 28
YAN-25 28
SEAB-6 28
YAN-8 28
YAN-9 28
KERO-1 24
THOM-2 24
KERO-2 24
MTB-1 24
HARRY-1 28
HARRY-2 28
TAM-1 21a
WELL-1 21a
PAGA-4 21a
PAGA-7 21a
HARRY-5 21a
WELL-2 21a
NEER-23 28
NEER-22 28
NEER-20 28
NEER-21 28
NEER-2 28
NEER-6 28
WOODV-1 28
Samples

Attachment 4: Public Comment Summary

The following table provides a summary of feedback from some of the submitters who Supported to the project, together with responses.

Summary of feedback	Summary responses
Recommended enhanced environmentally sensitive design for the proposal	Already under consideration as part of next stage design process
Propose the majority of worker accommodation traffic and primary access, inclusive of a new access road that also links to the Army Jetty, be accommodated to the south adjacent the railway line to limit traffic impacts on visitor movements along Parker Point Road	Consider as part of next stage design process
The need for further consultation with business as part of next stage design process	Additional consultation proposed with island businesses
Provide and consult on details about the layout/design of each unit, its build methodology and how this may impact visitors	Additional consultation proposed with island businesses
The contractor for the accommodation project being housed on the island for the construction period	To be considered as part of tender process
Need for accommodation to be of quality design to retain staff and comparable rents to mainland	Acknowledged, part of next design stage. Indicative rents have been provided to the island businesses as part of the Business Case analysis. These will be determined within the staff housing policy review.
Acknowledge the need for the design to be refined, including a range of improvements	Additional feedback to be provided to project team for consideration

The following table provides a summary of feedback from submitters who objected to the project, together with responses.

Summary of feedback	Summary responses
Lack of support for large numbers of workers being accommodated on the island generally	The provision of worker accommodation to service Island businesses is aligned with the Rottnest Island Management Plan
Social issues that may result from worker accommodation developments	Operational Management Plans will be required as part of progressing this project
Poor design of units	Propose additional design consultation with key businesses

Limited analysis justifying numbers proposed	The provision of worker accommodation to service Rottnest businesses is aligned with the Rottnest Island Management Plan
Changes to ferry operating hours need to be a consideration as part of the analysis	Acknowledged, consider as part of next project stage
Wants the analysis of submissions made public	Submissions were responded to where required. Publication of the responses were not required at the time.
The proposal should be referred to the Environmental Protection Authority (EPA) and should be put on hold until referral complete, and	A clearing permit application was submitted. During this assessment the Department of Water and Environmental Regulation, have ability to refer the proposal to the EPA. The project was not deemed to have significant impact and was not therefore referred to EPA. It is however noted that a third party can refer the project.
Environmental impacts (vegetation, human and fauna impacts) for the proposed site need to be reconsidered.	Consider environmentally sensitive design principles as part of next stage design process