GOLDEN BAY

MINISTERIAL IMPLEMENTATION STATEMENT NO. 297 COMPLIANCE ASSESSMENT REPORT YEAR 2023

Prepared for:	Peet Golden Bay Pty Ltd and DevelopmentWA
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pgv ENVIRONMENTAL

CONTENTS

Contents i

List of Attachments ii

1 INTRODUCTION 1

1.1 Background 1

1.2 Golden Bay Project Description 1

1.3 Proponent 1

1.4 Environmental Approval to Implement the Project 2

1.5 Scope of the Report 2

2 CURRENT STATUS OF PROJECT IMPLEMENTATION 4

2.1 Golden Bay Project 4

2.2 Current Project Activities 4

3 INSTANCES OF POTENTIAL NON-COMPLIANCE AND PREVENTATIVE ACTIONS UNDERTAKEN 6

4 PUBLIC AVAILABILITY OF REPORT 7

5 COMPLIANCE 8

5.1 Compliance Assessment Method 8

5.2 Statement of Compliance 8

5.3 Summary Audit Table 8

5.4 Compliance with Management Plans 12

5.4.1 TEC19a Photo Point Monitoring 12

5.4.2 Quenda Monitoring 13

5.4.3 Feral Fauna Control 15

5.4.4 Groundwater Levels Monitoring 15

5.4.5 Landscape Protection Management Plan 15

6 REFERENCES 17

LIST OF ATTACHMENTS

Tables

Table 1: Summary Audit Table Status

Plates

Plate 1: TEC19a (Sedgelands in Holocene Dune Swales)

Plate 2: Southern Brown Bandicoot (photo source G. Thomson Terrestrial Ecosystems)

Plate 3: Release Quenda (Terrestrial Ecosystems)

Plate 4: Groundwater Monitoring Bore (WB02)

Figures

Figure 1: Site Location

Figure 2: Proposal Area

Appendix

Appendix 1: Ministerial Statement 297

Appendix 2: OEPA Correspondence

Appendix 3: Statement of Compliance and Compliance Audit Table

Appendix 4: Foreshore Management Plan Action Table

Appendix 5: TEC19 Photo Point Monitoring Report Year 2022

Appendix 6: Quenda Monitoring Reports Year 2022

Appendix 7: Groundwater Levels in Foreshore Reserve Year 2012-2022

Appendix 8: Landscape Protection Area Baseline Flora, Vegetation and Weed Survey 2020

Appendix 9: Landscape Protection Area Management Plan

Appendix 10: Foreshore Management Plan – Addendum 2

1 INTRODUCTION

1.1 Background

The proposal to develop Part Lot 12 and Reserve 34664, Golden Bay for urban development was referred to the Environmental Protection Authority (EPA) under the *Environmental Protection Act 1986* (EP Act) in 1992 by H & B Developments. The EPA set the level of assessment as a Public Environmental Review (PER) (Assessment No. 604). The Minister for the Environment approved the proposal through Ministerial Statement 297 (MS 297) subject to environmental conditions in January 1993 (Attachment A).

Ministerial Statement 297 gave environmental approval subject to conditions to develop the landholding then known as Part Lot 12 and Reserve 34664, Golden Bay.

The Minister for the Environment confirmed on 30 July 1997 that the project had been substantially commenced, and as a result the environmental approval remains valid.

The Department of Environmental Protection (now the Department of Water and Environmental Regulation (DWER)) recognised the change in ownership to the Department of Housing and Works (now known as the Department of Communities (DoC)) and issued an Audit Table detailing the status of the Environmental Conditions and Commitments on 3 April 2001 (Attachment B).

The landholding is now referred to as Lot 2 Warnbro Sound Avenue (Lot 2) and Lot 3 Dampier Drive (Lot 3), Golden Bay.

1.2 Golden Bay Project Description

Golden Bay is located on the coast, approximately 62km south of the Perth Central Business District and 20km south of the City of Rockingham (Figure 1).

The landholding covers an area of approximately 161 hectares (ha) and is situated west of Mandurah Road (Figure 2). Lot 2 has approximately 800metres (m) of coastal frontage and the Foreshore Reserve covers an area of 10.61ha with vegetation that is largely in Excellent condition. Lot 3 has a Landscape Protection Area that conserves the parabolic dunal formation associated with Mandurah Hill, the highest point in the region.

The key environmental elements of the Golden Bay Proposal as described in the PER were listed as:

- Foreshore Reserve designation;
- Foreshore Reserve management;
- Landscape protection;
- Southern Brown Bandicoot Protection; and
- Protection of the heritage site.

1.3 Proponent

Peet Golden Bay Pty Ltd (Peet) and the Housing Authority (now DoC) formed a co-ownership in November 2014. The change in Proponent was endorsed by the Office of the Environmental Authority (now DWER) on 1 August 2016.

The Proponent for the project has changed from Peet Golden Bay Pty Ltd and the DoC to Peet Golden Bay Pty Ltd and Western Australian Land Authority as agent of the Housing Authority (trading as DevelopmentWA). DWER were informed of the change in ownership in April 2023.

1.4 Environmental Approval to Implement the Project

The proposal to develop the site was assessed through a Section 38 PER assessment process under the WA *Environmental Protection Act 1986* (EP Act). The project was approved through MS 297 in January 1993 (Appendix 1).

The Minister for the Environment confirmed on 30 July 1997 that the project had been substantially commenced.

1.5 Scope of the Report

Condition 8 of MS297 states the following:

8. Compliance Auditing

In order to ensure that environmental conditions and commitments are met, an audit system is required.

8-1 The Proponent shall prepare periodic 'Progress and Compliance Reports' to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

The reporting requirements set out in the Audit Table indicated that the first Compliance Assessment Report (CAR) was due before clearing activities commenced and the second one year after the clearing had commenced. Thereafter the submission of CARs was as required by the OEPA.

The OEPA advised in correspondence dated 8 April 2016 (Appendix 2) that a CAR was required to be submitted by 30 August 2016 and annually thereafter and to report on the period of the previous calendar year.

This is the eleventh CAR, the previous CARs were submitted on the following dates:

- 20 May 2010;
- 30 May 2011;
- 30 May 2012;
- 30 August 2016 (Report Period 2015);

- 30 August 2017 (Report Period 2016);
- 20 August 2018 (Report Period 2017);
- 30 August 2019 (Report Period 2018);
- 30 August 2020 (Report Period 2019);
- 30 August 2021 (Report Period 2020);
- 30 August 2022 (Report Period 2021);
- 30 August 2023 (Report Period 2022); and
- 30 August 2024 (Report Period 2023).

This CAR has been prepared in accordance with the OEPA *Guidelines for Preparing a Compliance Assessment Report, August 2012*. This report is based on the Proponent's assessment of compliance with the conditions in accordance with the MS 297 and the MS 297 Audit Table. This CAR covers the period between January 2023 to December 2023.

2 CURRENT STATUS OF PROJECT IMPLEMENTATION

2.1 Golden Bay Project

Peet is delivering the urban development project on behalf of the landowners in accordance with the approved Comprehensive Development Plan (Figure 2) will deliver the following:

- Residential Lots;
- Commercial Precinct;
- Primary and Secondary Schools;
- Local Public Open Space (recreational and drainage functions);
- Landscape Protection Area; and
- A Foreshore Reserve.

2.2 Current Project Activities

Development construction has progressed over Lot 2 both east and west of Warnbro Sound Avenue and progressed on Lot 3 (Figure 3). The following tasks have been undertaken to date:

- Phase 1 works have been completed in the Foreshore Reserve in accordance with the Foreshore management Plan (FMP);
- The Southern Brown Bandicoots are being managed on the site and monitored twice yearly within the Foreshore Reserve;
- Feral cat, fox and rabbit control has been undertaken in the Foreshore Reserve;
- The wetlands within the Foreshore Reserve have been monitored annually;
- Rehabilitation works have continued in the southern portion of the Foreshore Reserve;
- A small section of clearing on the southern end of the Foreshore Reserve was cleared to make way for the construction of the Wastewater Pump Station. The 2m wide strip of clearing was approved through Addendum 1 of the FMP. A Regulation 10 licence was approved by the Department of Planning, Lands and Heritage (DPLH) for these works;
- Earthworks adjacent to and in the Landscape Protection Area have commenced to tie in the development levels and attain the maximum grades allowed by the CoR;
- Some sections of the Landscape Protection Area adjacent to subdivision and landscape works have been fenced;
- The Landscape Masterplan for the Landscape Protection Area has been approved by the CoR. The masterplan will be incorporated into the Landscape Management Plan which is under revision;
- Civil construction works continued in Lots 2 and 3;
- Works complete on the Lot 3 Wastewater Pump Station;
- Landscape works to the Lot 3 Central Landscape Protection Area and Public Open Space landscaping – commenced;
- Stage 4 balance bulk earthworks (including the extension of Marillana Drive and Solstice Grove adjacent to the Foreshore Reserve were completed;
- The Landscape Protection Area on Lot 3 has been implemented;

- The Landscape Protection Area Management Plan has been contemporised and will provide the guiding framework for rehabilitation works in the conservation areas;
- Works on the northern section of the Foreshore have commenced including the northern beach access point, carpark and continuation of Solstice Grove:
- Bulk earthworks on the southern section of Lot 3 have commenced in accordance with the Landscape Protection Area Management Plan and subdivision approval;
- Some vegetation clearing has occurred in the south east corner of the Landscape Protection Area to stabilise the dune known as Mandurah Hill. The vegetation will be rehabilitated back to its original form as part of the works under the Landscape Protection Area Management Plan; and
- The proposed central internal paths through the conservation category wetlands were reviewed by the project team and the CoR in 2023 and it was determined that the internal access road and dual use paths provided adequate access to the beach for local residents. This decision provides significant benefit to the environmental values associated with the central section of the foreshore reserve. Addendum 2 has been appended to the FMP and to this compliance report detailing the change.

3 INSTANCES OF POTENTIAL NON-COMPLIANCE AND PREVENTATIVE ACTIONS UNDERTAKEN

In accordance with Condition 8-1 of MS 297, all instances of potential non-compliance with the conditions of MS 297 that are identified during the reporting period are to be reported in the annual CAR, and corrective and preventative actions taken are to be described. The status of all conditions is presented in Table 1 and Appendix 3.

There were no non-compliance issues during this reporting period.

4 PUBLIC AVAILABILITY OF REPORT

This CAR will be made publicly available within one month of being submitted to the OEPA. A copy of the most recent CAR will be placed on the Proponent's website until the subsequent annual CAR is placed on the website.

The website URL is www.peet.com.au/communities/perth-and-wa/golden-bay

5 COMPLIANCE

5.1 Compliance Assessment Method

An audit of the Golden Bay project was conducted in August 2022 to facilitate the assessment of compliance against MS 297 and the implementation of actions to meet environmental conditions. The audit was conducted by Belinda Heath of PGV Environmental.

The compliance status terminology to define the level of compliance used during the audit follows the EPA's *Post Assessment Guideline for Preparing an Audit Table* and is listed below:

- C = Compliant;
- CLD = Completed;
- NC = Non – compliant
- NR = Not Required at this stage;
- IP = In Process may only be used by the proponent in circumstances outlined in Section 2.8 of the guideline

The information reviewed and the evidence obtained during this audit has been presented within the Compliance Assessment Audit Table (Appendix 3), along with additional information gathered during a desktop study/investigation.

5.2 Statement of Compliance

The Statement of Compliance and the Compliance Assessment Audit Table are attached at Appendix 3.

5.3 Summary Audit Table

Details on compliance with the MS 297 conditions and management plans are presented below in a summary audit table (Table 1). The detailed Compliance Assessment Audit Table is provided at Appendix 3.

Table 1: Summary Audit Table Status

Audit Code	Requirement	Status	Comment
297:M1-1	Fulfil the commitments	CLD	All commitments have been fulfilled
297:M2-1	Adhere to the Proposal	C	
297:M2-2	Seek approval for modifications to the Proposal	C	No modifications sought
297:M3-1	Provide a Foreshore Reserve for conservation and recreation which: 1. Protects the Peelhurst Wetlands and the Southern Brown Bandicoot (*Isoodon obesulus*) population; and 2. Includes landscape and recreation values at least equivalent to the area affected by this proposal which is within System 6 Recommendation M107 Area.	CLD	4 June 1993
297:M3--2	Transfer to public ownership the proposed Foreshore Reserve as required by M3-1.	CLD	4 June 1993
297:M4-1	Liaise with the Department of Planning and Urban Development (DPUD) and the CoR to incorporate planning measures which recognise and protect the landscape value of the parabolic ridge on the eastern edge of Golden Bay.	CLD	5 April 1994
297:M5-1:1	Establish the regional implications of disturbing the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay.	CLD	6 February 1996
297:M5-1:2	Initiate management of the population of the Southern Brown Bandicoot (*Isoodon obesulus*)	CLD	Submitted 20 May 2010
297:M5-2:1	Carry out the ongoing management of the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay as proposed in M5-1.	C	All stages of development have included a relocation program prior to any clearing activity. Monitoring the Foreshore Reserve bandicoot population has continued in Autumn and Spring
297:M5-2:2	Carry out the ongoing management of the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay as proposed in M5-1.	NR	Post development management
297:M6-1	Seek approval for transfer of ownership, control or management of this project.	C	Proponents are DevelopmentWA and Peet Golden Bay Pty Ltd
297:M7-1	Seek approval to extend approval to implement proposal.	CLD	Minister for Environment confirmed project has commenced on 30 July 1997

297:M8	Prepare a periodic 'Progress and Compliance Report' to help verify the environmental performance of this project.	C	OEPA has requested (Appendix 2) that from August 2016 compliance reports are to be submitted annually by 30 August for the previous calendar year.
297:P1	Provide in exchange for the development of the currently proposed System 6 Area M107, additional Regional and Public Open Space adjacent the Coastal Reserve as shown in the Structure Plan, in excess to that which would normally be required by DPUD.	CLD	26 October 1995 Not Audited (duplicated by condition M3-1) – Audit Branch
297:P2	Prepare a Management Plan for the coastal reserve at Golden Bay.	CLD	Golden Bay FMP approved by the OEPA on 30 March 2012 (on advice from DPLH and CoR) An addendum to the FMP to address the interface between the development and Foreshore Reserve was submitted and approved by the OEPA on 29 September 2016
297:P3	Include the historic aboriginal camping site within the proposed Public Open Space for the development.	CLD	13 December 1995
297:P4	Protect against Bushfire	CLD	Fire Management Plan for the Golden Bay Structure Plan Area was approved by the CoR in March 2012.
297:P5	Provide reticulated sewerage and stormwater drainage designated to infiltrate stormwater into the soil within the development site.	CLD	A Local Water Management Strategy (LWMS) has been prepared for the Structure Plan Area and approved by the DWER and the CoR. Urban Water Management Plans (UWMPs) are being

			prepared in accordance with the LWMS for each stage of subdivision.
297:P6	Liaise with CALM regarding the presence of bandicoots at Golden Bay and examine feasibility of relocating bandicoots if required by CALM.	CLD	13 December 1995

5.4 Compliance with Management Plans

Commitment 2 of MS 297 required that a management plan be prepared for the Foreshore Reserve on advice from the DPLH and the CoR.

The Golden Bay FMP was prepared in consultation with the DPLH and the CoR and approved by the OEPA on 30 March 2012 (Appendix 3).

An addendum to the FMP to address the interface between the development and Foreshore Reserve was submitted and approved by the OEPA on 29 September 2016 (Appendix 8).

The FMP provides for the management and conservation of the Peelhurst Wetlands, Quenda, TEC 19a (Sedgelands in Holocene Dune Swales) and the Indigenous Heritage site located within the approved Foreshore Reserve. In addition, the FMP details the proposed infrastructure, recreational activities and relevant management strategies as proposed in the PER.

Implementation of the FMP has commenced and a status update on the management actions are provided in Appendix 4.

Addendum 2 to the FMP has been prepared for the change to the paths through the wetlands in the central section of the Foreshore Reserve (Appendix 10). The vegetation in the central section of the foreshore reserve has recovered from the fire in 2016 and has overgrown all of the tracks that were going to be upgraded. The intent for the paths was to provide residents with additional access to the beach. A project review and consultation with the City of Rockingham resulted in the decision to not construct the path system through the wetlands. This decision will provide further protection to the environmental values (Quenda, Sedgelands in Holocene Dunes ecological community, Conservation category wetlands and Indigenous Heritage Site) in the central foreshore reserve.

5.4.1 TEC19a Photo Point Monitoring

The condition of the TEC19a (*Sedgelands in Holocene Dune Swales*) has been recorded annually through photo point monitoring survey conducted in late September/October. The survey records the overall condition of the TEC and provides a basis to determine if the TEC is improving/degrading over time.

The photo point monitoring survey results are provided in Appendix 5.

Plate 1: TEC19a (Sedgelands in Holocene Dune Swales)



5.4.2 Quenda Monitoring

The local population of Quenda within the Foreshore Reserve have been monitored in Autumn and Spring for nine years by Terrestrial Ecosystems. The monitoring reports for 202 are provided at Appendix 6 and summarised below.

Autumn Survey

The Autumn survey caught nine (9) individual Quenda (8 females and 1 males) (Terrestrial Ecosystems, 2023a).

All captured Quenda appeared healthy, and mange was not observed on any Quenda during this survey. The population appears to be unbalanced with only a single male trapped. None of the females carried pouched young which in part could be attributable to the lack of males in the population. Of the 9 Quenda, five female Quenda were caught for the first time during this monitoring program and did not have a microchip (Terrestrial Ecosystems, 2023a).

In addition to the Quenda, 20 bobtails (*Tiliqua rugosa*; Plate 4), 24 rats *(Rattus rattus*), 4 house mice (*Mus musculus*), 11 Grey-breasted White-eye (*Zosterops lateralis*), and 2 White-browed Scrubwren (*Sericornis frontalis*) and 3 Cats (*Felis catus*) were also caught (Terrestrial Ecosystems, 2022a).

Fresh fox, cat and an abundance of rabbit tracks were observed on multiple occasions near the Foreshore Reserve boundaries. Based on the fox tracks and 3 cats being caught during the survey, it is likely these predators are having an impact on the Quenda population.

Western Grey Kangaroos were observed on several days during the survey, as well as their tracks and scats, indicating there continues to be population of kangaroos in the Foreshore Reserve (Terrestrial Ecosystems, 2023a).

Spring Survey

The Spring survey caught 17 individual Quenda (12 females and 4 males and one escape before sexing). Two juveniles (<300g) were captured – one female and one male. Of the 12 females caught 8

had pouched young. Each female bearing young had between 2 and 3 young for a total of 18 young. (Terrestrial Ecosystems, 2023b).

Most captured Quenda appeared healthy, and mange was not observed on any Quenda during this survey. Of the 17 Quenda caught, 7 were caught for the first time during this monitoring program and did not have a microchip. The remaining 9 Quenda had been caught during previous monitoring surveys (Terrestrial Ecosystems, 2023b).

In addition to the Quenda, 51 Bobtails (*Tiliqua rugosa*), 5 black rats (*Rattus rattus*), 6 Rabbits (*Oryctolagus cuniculus*), 11 house mice (*Mus musculus*), 11 silvereyes (*Zosterops lateralis*), 1 Western Beard Dragon (*Pogon minor*) and 2 White-browed Scrubwren (*Sericornis frontalis*) were captured (Terrestrial Ecosystems, 2022b).

Western Grey Kangaroos were observed on most days during the survey, as well as their tracks and scats. Rabbits were observed and caught during the trapping survey.

People were observed walking their dog(s) along the bank on the eastern side of the Foreshore Reserve and along the newly constructed road into the car park on the western side, but there was little sign of dogs being walked within the reserve.

Survey Summary

The results of the 2022 trapping program show the decline recorded in 2022 may have turned around. There is evidence of Quenda recruitment or breeding. There is evidence of breeding in the Quenda population however because of predation by large snakes, cats and foxes the chances of the young and juveniles surviving to full maturity is still poor. The continuation of a management program for rabbits, foxes and cats is essential to maintaining a viable population of Quenda.

Peet has funded an ongoing fox and cat reduction program, and the City's contractors occasionally trap foxes near the reserve.

Plate 2: Quenda (photo source G. Thomson Terrestrial Ecosystems)



Plate 3: Quenda being Released (Photo source: Terrestrial Ecosystems)



Fauna Relocation

There was no requirement for relocation of Quenda during the reporting period.

5.4.3 Feral Fauna Control

A feral fauna trapping program was undertaken in Autumn 2023. Three cats were trapped and given to the City, two of which have been trapped previously. One female fox was trapped and euthanised (Terrestrial Ecosystems, 2023c)

5.4.4 Groundwater Levels Monitoring

The groundwater levels in the Foreshore Reserve are monitored each month. The levels for the period July 2012 to December 2022 are provided at Appendix 7.

Plate 4: Groundwater Monitoring Bore (WB02)



5.4.5 Landscape Protection Management Plan

Development of the northern end of Lot 3 commenced in 2017.

The Landscape Protection Area has been partially fenced to protect it from construction activity.

The recently approved LSP over Lot 3 includes a condition for the original Landscape Protection Area Management Plan (1994) to be revised to represent contemporary management of bushland areas. A baseline flora, vegetation and weed survey was conducted in Spring 2020. The findings of this survey informed the revision of the original Landscape Protection Area Management Plan. Importantly, the area of dunes protected under the Landscape Protection Area set in 1994 will not change.

Rehabilitation works in the Landscape Protection Areas has continued as part of subdivisional and landscape works in accordance with the CoR approved Golden Bay Landscape Protection Area Management Plan. (Appendix 9).

Monitoring landscape protection rehabilitation areas to commenced in 2023.

6 REFERENCES

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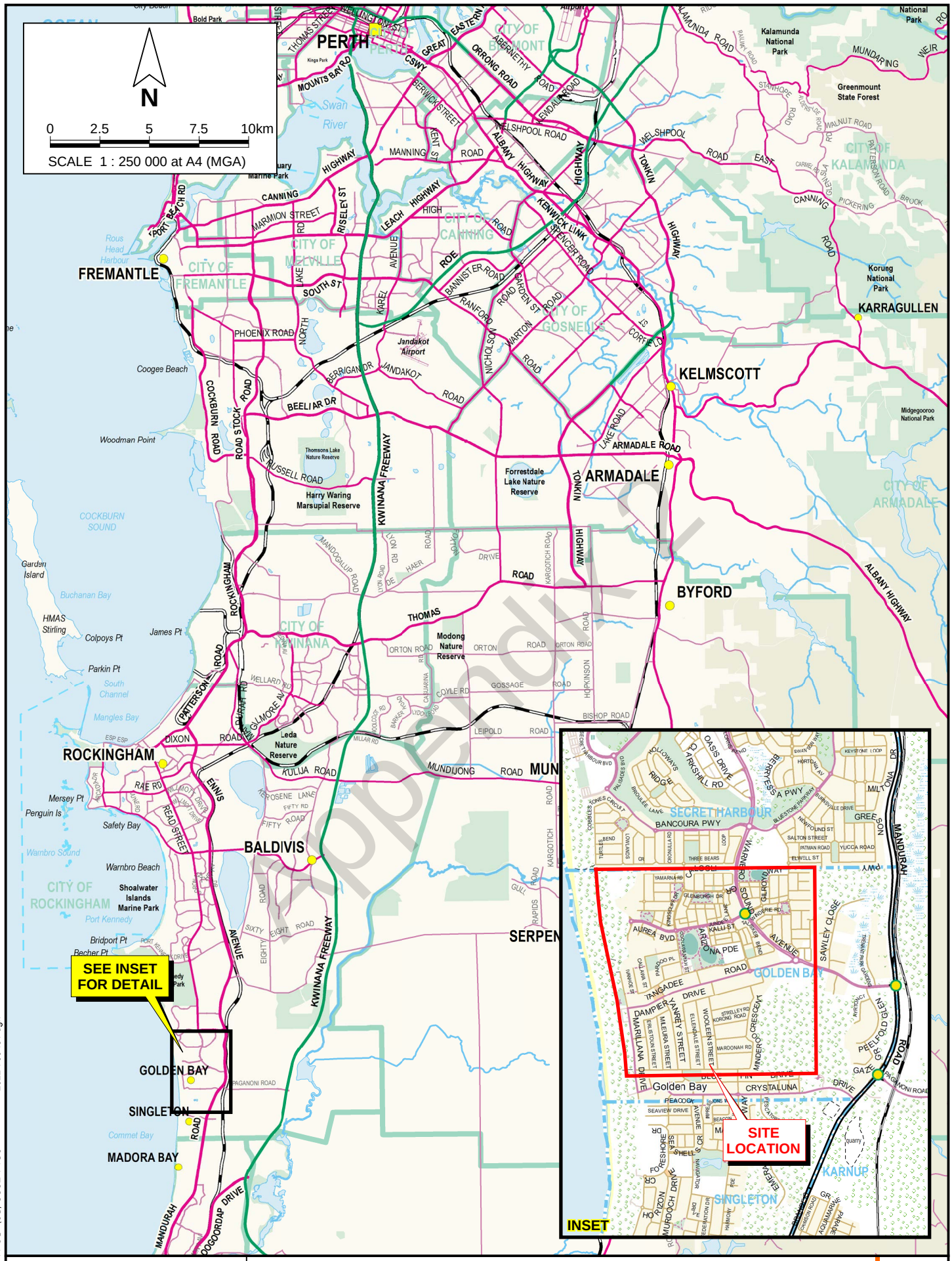
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Terrestrial Ecosystems (2022b). *Quenda Monitoring Golden Bay – Spring 2022. Report prepared for Peet Limited.*

FIGURES



Appendix

PINPOINT CARTOGRAPHICS (08) 9562 7136 2022-700-f01.dgn

pgv ENVIRONMENTAL

Department of Housing and Peet Golden Bay Pty Ltd
COMPLIANCE ASSESSMENT REPORT
GOLDEN BAY

Drawn: B. Heath	Date: 30 Aug 2022
Job: 10004 Rpt: 2022-700	Revision: A

REGIONAL LOCATION

Figure 1

LEGEND

- Comprehensive Development Plan Boundary
- Stage 1 Boundary (Refer note 6)
- 400m Walkable Catchment to Neighbourhood Centre

Zones:

- Residential R5
- Residential R20
- Residential R30
- Residential R40
- Residential R60
- Residential R80
- Commercial Zone Neighbourhood Centre Precinct - (Refer notes 4 and 5)

Road Heirachy:

- Primary Distributor
- District Distributor A / Integrator A
- Integrator B
- Neighbourhood Connector A
- Neighbourhood Connector B

Reserves:

- Public Open Space/ Drainage
- Local Reserve Public Purposes Drainage
- Existing Open Space
- Landscape Protection Area (refer note 2)
- Existing MRS Parks and Recreation Reserve
- MRS Reserve Public Purposes Primary School/High School

NOTES:

1. The boundary to the Comprehensive Development Plan (CDP) Update is in accordance with the approved CDP 1994 and original lot 12 boundary.
2. Landscape Protection Areas are in accordance with the approval of the State Minister for the Environment 1993.
3. *The access street layout is indicative only* and subject to refinement as part of the detailed subdivision design process.
4. The Neighbourhood Centre Precinct is a main street based centre and is subject to the preparation of a Detailed Area Plan. Refer CDP Update Report.
5. Where residential uses are proposed in the Neighbourhood Centre Precinct an R60 density code shall apply.
6. Stage 1 approved pursuant to endorsed CDP, refer WAPC Ref: 141268 and 142741.
7. Full movement four way intersection at Wambro Sound Avenue and Coastal Boulevard, and full movement T intersection north of traffic lights as approved in principle by Main Roads WA Dec 2010.
8. POS areas are indicative only and subject to further detailed design and drainage considerations.
9. All road carriageway detail depicted on this Plan including pavements, road treatments, medians and parking are for illustrative purposes only and are subject to final engineering design and any relevant approvals. The detail reflects the ntent of the road network standards preferred for this subdivision. All dimensions and areas depcted on this Plan are subject to pre-cal and final survey and will vary from the figures shown.
10. All development on lots that fall within a hazard separation zone, as identified by the endorsed Golden Bay Fire Management Plan, must be constructed to the appropriate standard as specified in *Australian Standard 3959 Construction of Buildings in Bushfire-Prone Areas*.

Coastal Node:
Surf club and beach access facilities
Refer Foreshore Management Plan

SECRET HARBOUR

COMET BAY HIGH SCHOOL

HIGH SCHOOL 0.8ha

Warnbro Sound Avenue Intersections. Refer note 7.

RES 27066

FORESHORE RESERVE

COASTAL PRECINCT

2
82.738ha

2
35.320ha

NEIGHBOURHOOD CENTRE PRECINCT
(Refer notes 4 and 5)

WARNBRO SOUND AVENUE

STAGE 1

RHONDA SCARROTT RESERVE

Existing Community Building

PRIMARY SCHOOL 3.5ha

WOODLANDS ROAD

TANGADEE ROAD

DAMPIER DRIVE

LANDSCAPE PROTECTION AREAS
(Refer note 2)

Existing roundabout subject tc upgrading. Refer CDP Update Transport Assessment.

3
35.665

MARILLANA DRIVE

MINDEROO CRESCENT

GOLDEN BAY

INDIAN OCEAN

KARNUP ROAD

FUTURE KARNUP STATION

N

0 50 100 150 200 250m

SCALE 1 : 8 000 at A3 (MGA)

Appeal

SOURCE: Chappell Lambert Everett, Plan No. 2187-29U-01, 28-02-2011.

CHAPPELL LAMBERT EVERETT

PINPOINT CARTOGRAPHICS (08) 9562 7136 2022-700-f02.dgn

pgv ENVIRONMENTAL

Department of Housing and Peet Golden Bay Pty Ltd
COMPLIANCE ASSESSMENT REPORT
GOLDEN BAY

Drawn: B. Heath	Date: 31 Aug 2022
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COMPREHENSIVE DEVELOPMENT PLAN

Figure 2

PINPOINT CARTOGRAPHICS (08) 9562 7136 2022-700-f03.dgn

382 250mE
382 500mE
382 750mE
6 412 500mN
6 412 250mN
6 412 000mN

1 2 3 4 5 6 8

501 R 27066
502 R 27066
503
500 R 27066
2486 R 34664
9029
R 52131
R 35364

N

0 20 40 60 80 100m

SCALE 1 : 3 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Subdivision Boundary
- Coffey Environments and DEC Approved TEC19a Boundary October 2010

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2022.

pgv ENVIRONMENTAL

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Department of Housing and Peet Golden Bay Pty Ltd
COMPLIANCE ASSESSMENT REPORT
GOLDEN BAY

PHOTO POINT MONITORING LOCATIONS

Figure 3

APPENDIX 1

MINISTERIAL STATEMENT 297

Appendix 2

Appendix 1

Ass # 604

Bull # 648

State # 297

WESTERN AUSTRALIA

MINISTER FOR THE ENVIRONMENT

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

URBAN DEVELOPMENT OF PART LOT 12 & RESERVE 34664 (AFFECTING PART OF SYSTEM SIX RECOMMENDATION M107), GOLDEN BAY (604)

H & B DEVELOPMENTS PTY LTD

This proposal may be implemented subject to the following conditions:

1 Proponent Commitments
The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and included in Environmental Protection Authority Bulletin 648. (A copy of the commitments is attached.)

2 Implementation
Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 Foreshore Reserve

3-1 The proponent shall provide a foreshore reserve for conservation and recreation which:

1 protects the Peelhurst wetlands and the Southern Brown Bandicoot (*Isoodon obesulus*) population; and
2 includes landscape and recreation values at least equivalent to the area affected by this proposal which is within System 6 Recommendation M107 Area.

3-2 Prior to the lifting of Urban Deferment, the proponent shall identify the foreshore reserve as required by condition 3-1, and at subdivision the proponent shall transfer to public ownership the proposed foreshore reserve, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Published on
12 JAN 1993

Appendix 2

18th FLOOR, ALLENDALE SQUARE, 77 ST GEORGE'S TERRACE, PERTH, W.A. 6000 TELEPHONE 325 9422 FAX. 325 5621

4 Landscape Protection
The landscape value of the parabolic dune ridge on the eastern edge of Golden Bay should be recognised.

4-1 Prior to subdivision approval, the proponent shall liaise with the Department of Planning and Urban Development and the City of Rockingham to incorporate planning measures which recognise and protect the landscape value of the parabolic dune ridge on the eastern edge of Golden Bay, to the requirements of the Minister for the Environment and the Minister for Planning on advice of the Department of Planning and Urban Development, the City of Rockingham and the Environmental Protection Authority.

5 Southern Brown Bandicoot (*Isoodon obesulus*)
The population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay requires special consideration.

5-1 Prior to the commencement of development and in consultation with the Department of Conservation and Land Management, the proponent shall establish the regional implications of disturbing the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay and shall initiate management of the population, to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

5-2 The proponent shall carry out the on-going management of the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay to the requirements of the Department of Conservation and Land Management.

6 Proponent
These conditions legally apply to the nominated proponent.

6-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

7 Time Limit on Approval
The environmental approval for the proposal is limited.

7-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

8 Compliance Auditing
In order to ensure that environmental conditions and commitments are met, an audit system is required.

Appendix 2

8-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Appendix 2

Jim McGinty, MLA
MINISTER FOR THE ENVIRONMENT

12 JAN 1993

PROPONENT'S COMMITMENTS

URBAN DEVELOPMENT OF PART LOT 12 & RESERVE 34664
(AFFECTING PART OF SYSTEM SIX RECOMMENDATION M107)
GOLDEN BAY (604)

H & B DEVELOPMENTS PTY LTD

The proponent has made the following environmental commitments:

Appendix 2

CONSOLIDATED LIST OF COMMITMENTS FOR GOLDEN BAY

1. The proponent will provide, in exchange for the development of the currently proposed System 6 Area M107, additional Regional and Public Open Space adjacent to the Coastal Reserve as shown in the Structure Plan, in excess to that which would normally be required by DPUD. This will be done to the satisfaction of the EPA, DPUD and the Local Authority at the rezoning stage.

2. The proponent will prepare a Management Plan for the Coastal Reserve at Golden Bay prior to development commencing. This will be done to the satisfaction of DPUD and the Local Authority.

3. The proponent will include an historic aboriginal camping site within the proposed Public Open Space for the development. This will be done to the satisfaction of the Local Authority.

4. The proponent will continue to provide and maintain a network of firebreaks and access tracks to protect against bushfire until the Local Authority takes on this responsibility. This will be done to the satisfaction of the Local Authority.

5. The proponent will provide reticulated sewerage and will design the development so that stormwater drainage is disposed of on site. This will be done during the installation of services within the development to the satisfaction of DPUD and the Local Authority.

6. The proponent will liaise with CALM regarding the presence of bandicoots at Golden Bay and if required by CALM will examine the feasibility of relocating the bandicoots to an appropriate location elsewhere. This will be done prior to any disturbance of the vegetation at Golden Bay and will be done to the satisfaction of both CALM and the EPA.

Appendix 2

APPENDIX 2

OEPA CORRESPONDENCE

Appendix 2

Government of **Western Australia**
Office of the **Environmental Protection Authority**

HOUSING AUTHORITY RECEIVED By Post 08 APR 2016 Corporate Information

Mr Alex Horsburgh
Senior Project Manager
Department of Housing
169 Hay Street
EAST PERTH WA 6175

3RD HAY ST.

Our Ref: *16-006294*
Enquiries: *Rowan Inglis, 6145 0849*
Email: *rowan.inglis@epa.wa.gov.au*

16/D643004

Dear Mr Horsburgh

MINISTERIAL STATEMENT 297 – URBAN DEVELOPMENT OF PART LOT 12 & RESERVE 34664, GOLDEN BAY – ANNUAL COMPLIANCE ASSESSMENT REPORT REQUIRED

Ministerial Statement 297 places conditions on the implementation of the proposal above. Condition 8-1 of Statement 297 requires preparation and submission of a Compliance report.

The Office of the Environmental Protection Authority (OEPA) advises the Department of Housing that a Compliance Report reporting on the period of the previous calendar year (January to December 2015) is required to be submitted by **30 August 2016** and annually thereafter to demonstrate compliance with Statement 297.

The CAR must be developed in accordance with the following:

- Post Assessment Guideline for Preparing a Compliance Assessment Report
- Post Assessment Guideline for Preparing an Audit Table

These documents are available on the OEPA website www.epa.wa.gov.au

If you have any queries regarding this matter, or wish to align the submission of the Compliance Report with reporting submitted to other government agencies, please contact Rowan Inglis on 6145 0849.

Yours sincerely

Mr Ian Munro
MANAGER COMPLIANCE BRANCH

31 March 2016

Appendix 2

Level 8, The Atrium, 168 St Georges Terrace, Perth, Western Australia 6000
Telephone 08 6145 0800 Facsimile 08 6145 0895 Email info@epa.wa.gov.au

Locked Bag 10, East Perth WA 6892

www.epa.wa.gov.au

Reserve Enquiry Detail [5100L]

Screen Friendly Print Page

Reserve	34664	**Legal Area (ha)**	1.2757
Name		**Status**	Current
Type		**Current Purpose**	PUBLIC RECREATION
Notes			
File Number	3915/62		

Class	Responsible Agency	Date of Last Change
C	DEPARTMENT FOR PLANNING AND INFRASTRUCTURE	23/10/1995

Management Orders	Document	Land Use	Local Government Authority
THE CITY OF ROCKINGHAM		PUBLIC RECREATION	ROCKINGHAM, CITY OF

Add Item	CLT Number	Parcel Identifier	Street Address	Suburb	File Number	PIN	Area (sqm)	Map Viewer
☐	LR3067-211	Lot 2486 On Diagram 28721			3915/1962.	368857	12757.0	

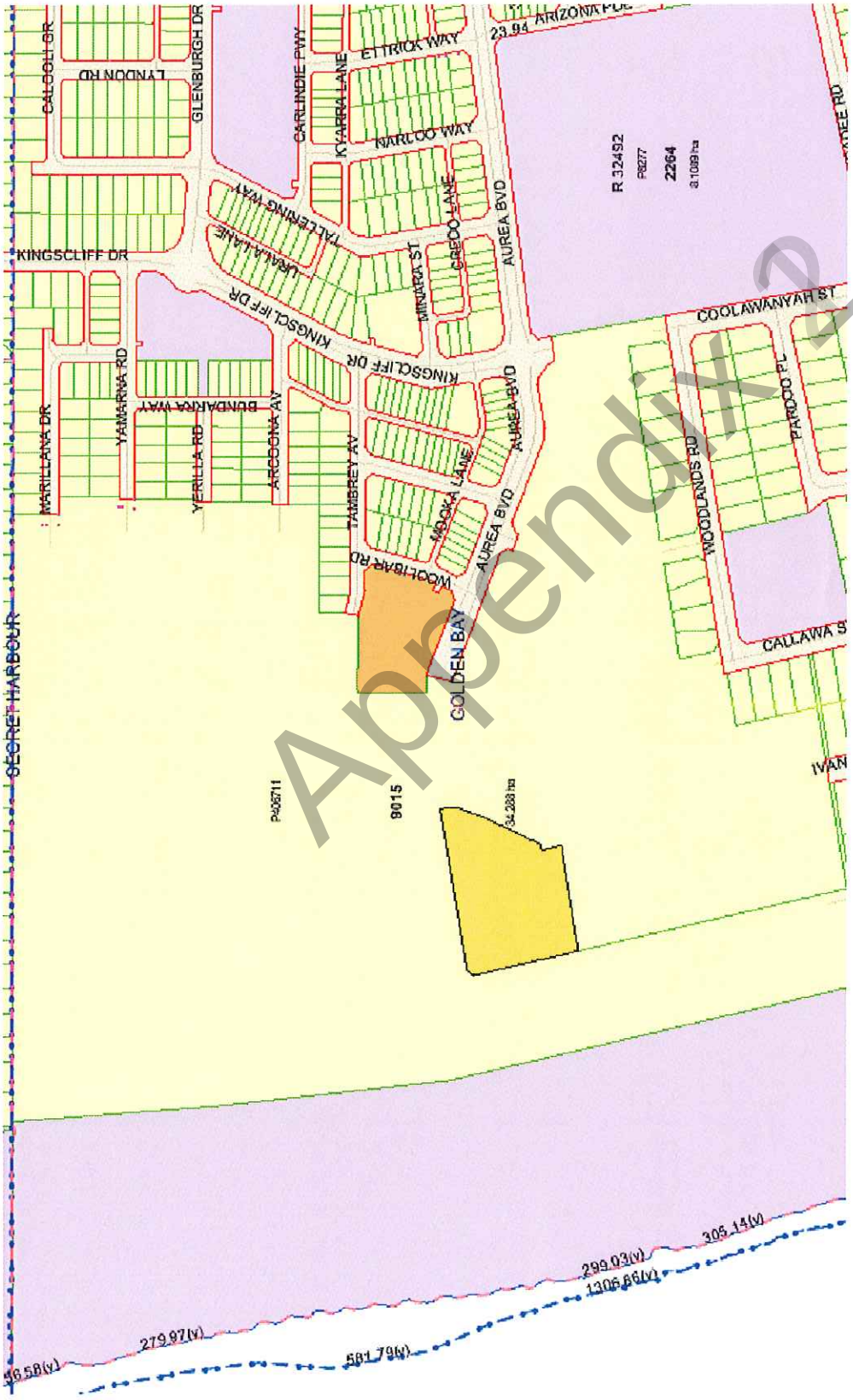
Reserve Number 34664

Previous Certificates of Title		Historic Crown Allotments		
LR3053-222	Cancelled	COCKBURN SOUND	Location	2486

Gaz Page/Document	Date	Type	Text
4852	17/10/1995	Current Area	1.2757
4852	17/10/1995	Public Plan	BG33 (2) 7.13
2593	12/08/1977	Current Vesting	VEST SHIRE OF ROCKINGHAM
1841	17/06/1977	Formerly	FORMERLY PTN COCKBURN SOUND 16 LOT 246-D:28721
1841	17/06/1977	Original Gazettal and page	ORIGINAL GAZETTE
	17/06/1977	Class	C
	17/06/1977	Current Purpose	PUBLIC RECREATION
	17/06/1977	Correspondence File Number	3915/62
	17/06/1977	Historical Area	2.4306
	17/06/1977	Location	COCKBURN SOUND,2486

Appendix 2

Appendix 2


CALGOLI DR
LYNDON RD
GLENBURGH DR
CARLINGIE PWY
KYARRA LANE
ETTRICK WAY
NARLOO WAY
ARIZONA PDE
23.94
R 32492
P8277
2264
3.1089 ha
TALLENNING WAY
KINGSCLIFF DR
LIRALA LANE
CREDO LANE
MINARA ST
AUREA BVD
COOLAWANYAH ST
KINGSCLIFF DR
MARILLANA DR
YAMARNA RD
BUNDARRA WAY
YERILLA RD
ARGONA AV
TAMBREY AV
MOOKA LANE
WOOLIBAR RD
AUREA BVD
GOLDEN BAY
SECRET HARBOUR
WOODLANDS RD
PARODO PL
CALLAWA S
IVAN
P406711
9015
34.288 ha
306.14(V)
299.03(V)
1306.66(V)
279.97(V)
581.79(V)
46.58(V)

Appendix 2

APPENDIX 3

STATEMENT OF COMPLIANCE AND AUDIT TABLE

Urban Development of Part Lot 12 and Reserve 34664, Golden Bay (Assessment 604, Statement 297)

Ministerial Statement 297 Audit Table

Note:

Phases that apply in this table = Pre-Construction, Construction, Operation, Decommissioning, Overall (several phases)

This audit table is a summary and timetable of conditions and commitments applying to this project. Refer to the Minister's Statement for full detail/precise wording of individual elements.

Code prefixes: M = Minister's condition; P = Proponent's commitment; A = Audit specification; N = Procedure.

Abbreviations: CAR = Compliance Assessment Report; LPA= Landscape Protection Area; FMP = Foreshore Management Plan; CEO = Chief Executive Officer of OEPA; Minister for Env. = Minister for the Environment; OEPA = Office of the Environmental Protection Authority; CoR = City of Rockingham; DoT = Department of Transport; CALM = Department of Conservation and Land Management (now known as Department of Parks and Wildlife); DPUD = Department of Planning and Urban Development (now Department of Planning, Lands and Heritage)

Compliance Status: C = Compliant, CLD = Completed, NC = Non–compliant, NR = Not Required at this stage. Please note the terms NA = Not Audited and VR = Verification Required are only for OEPA use. IP = In Process may only be used by the proponent in circumstances outlined in Section 2.8 of the *Post Assessment Guideline for Preparing an Audit Table*.

Audit Code	Subject	Requirement	How	Evidence	Phase	To requirements of On advice from	Timeframe	Status	Comment
297: IM1-1	Commitments	Fulfil the commitments	As per attachment to the Minister's statement.	CAR	Overall	EPA DPaW		C	
297: IM2-1	The Proposal	Adhere to the Proposal	In accordance with any designs, specifications, plans or other technical material submitted by the Proponent to the OEPA.	CAR	Overall	EPA DPaW	Throughout life of the project	C	No changes proposed
297: IM2-2	The Proposal	Seek approval for modifications to the Proposal	Submit a written request to the Minister for Env. detailing changes to designs, specifications, plans or other technical material.	Correspondence to OEPA	Overall	Minister for Env. EPA	Throughout life of the project	C	No changes proposed
297: IM3-1	Foreshore Reserve	Provide a Foreshore Reserve for conservation and recreation which: 1. Protects the Peelhurst Wetlands and the Southern Brown Bandicoot (Isoodon obesulus) population; and 2. Includes landscape and recreation values at least equivalent to the area affected by this proposal which is within System 6 Recommendation M107 Area.	Make a submission to the Minister for Env. for approval on advice of the EPA.	Submission to the Minister for Env.	Pre-Construction	Minister for Env. EPA	Prior to lifting of 'Urban Deferred'	CLD	4 June 1993
297: IM3–2	Foreshore Reserve	Transfer to public ownership the proposed Foreshore Reserve as required by IM3-1.	Make a submission to the Minister for Env. on advice of the CALM	Submission to the Minister for Env.	Pre-Construction	Minister for Env. EPA	Prior to lifting of 'Urban Deferred'	CLD	4 June 1993
297: IM4-1	Landscape Protection	Liaise with the DPUD and the CoR to incorporate planning measures which recognise and protect the landscape value of the parabolic ridge on the eastern edge of Golden Bay.	Make a submission to the Minister for Env. and the Minister for Planning for approval on advice of the DPUD, CoR, EPA	Submission to the Minister for Env. and Minister for Planning	Pre-Construction	Minister for Env. Minister for Planning DPUD CoR EPA	Before or as a condition of subdivision	CLD	5 April 1994
297: IM5-1:1	Southern Brown Bandicoot	Establish the regional implications of disturbing the population of the Southern Brown Bandicoot (Isoodon obesulus) at Golden Bay.	Make a submission to the Minister for Env. on advice of the CALM	Correspondence with Minister for Env.	Pre-Construction	Minister for Env. CALM	Prior to any clearing/construction activities commencing	CLD	6 February 1996

Appendix 3

	Subject	Requirement	How	Evidence	Phase	To requirements of On advice from	Timeframe	Status	Comment
297: IM3-1:2	Southern Brown Bandicoot	Initiate management of the population of the Southern Brown Bandicoot (Isoodon obesulus)		Report on this in the first report required under IM8	Pre-Construction	Minister for Env. CALM	Prior to any clearing/construction activities commencing	CLD	CAR Submitted 20 May 2010
297: IM5-2:1	Southern Brown Bandicoot	Carry out the ongoing management of the population of the Southern Brown Bandicoot (Isoodon obesulus) at Golden Bay as proposed in IM5-1.	Agreement with CALM	Report on this under IM8	Construction	CALM	Ongoing	C	All stages of development have included a relocation program prior to any clearing activity.
297: IM5-2:2	Southern Brown Bandicoot	Carry out the ongoing management of the Southern Brown Bandicoot (Isoodon obesulus) at Golden Bay as proposed in IM5-1.	Agreement with CALM	Report on this under IM8	Post Development	CALM	Ongoing	C	Southern Brown Bandicoots are monitored in Autumn and Spring each year in the Foreshore Reserve in accordance with the FMP.
297: IM6-1	Project Ownership, management, control	Seek approval for transfer of ownership, control or management of this project.	Letter to the Minister for Env. together with the new proponent's endorsement of the Ministerial Statement	Letter and statement endorsed by the replacement proponent	Overall	Minister for Env. EPA	Before transfer of ownership	C	EPA informed of change in ownership Department of Communities and Peet to Development WA and Peet in April 2023
297: IM7-1	Time limit on approval	Seek approval to extend approval to implement proposal.	Application to be made before the end of five years (from the publish date of the Minister's Statement)	Letter application	Overall	Minister for Env. EPA	Before 12 January 1998 if project has not commenced substantially	CLD	
297: IM8	Compliance auditing	Prepare a periodic 'Progress and Compliance Report' to help verify the environmental performance of this project.	The report (CAR) should be an update on the project giving evidence of how compliance has been achieved. It should list each condition and commitment to be reported on showing for each: its code no. form the audit table; what action it requires; what has been done to meet the condition or commitment including any problems that may have arisen and what the proponent has done to address them; how compliance can be verified.	CAR providing evidence of compliance for each relevant audit element in the audit table.	Overall	EPA	First report before clearing activities commence, second report one year after clearing has commenced, then as required by the OEPA.	C	OEPA has requested (Appendix 2) that from August 2016 CARs are to be submitted annually in August for the previous calendar year.
297: P1	Foreshore Reserve	Provide in exchange for the development of the currently proposed System 6 Area M107, additional Regional and Public Open Space adjacent the Coastal Reserve as shown in the Structure Plan, in excess to that which would normally be required by DPUD.	Duplicated by M3-1		Pre-Construction	EPA DPUD CoR	At the rezoning stage	CLD	26 October 1995 Not Audited (duplicated by condition M3-1) – Audit Branch
297: P2	Management Plan	Prepare a Management Plan for the coastal reserve at Golden Bay.	In a submission to the CoR, Minster for Planning and EPA.	Management Plan for Foreshore Reserve to be submitted	Pre-Construction	EPA Minister for Planning CoR DEP	Before clearing/construction activities commence	CLD	Golden Bay FMP approved by the OEPA on 30 March 2012. (on advice from DoP and CoR). An addendum to the FMP to address the interface between the development and

Appendix 3

	Subject	Requirement	How	Evidence	Phase	To requirements of On advice from	Timeframe	Status	Comment
									Foreshore Reserve was submitted and approved by the OEPA on 29 September 2016.
297: P3	Historic Site	Include the historic aboriginal camping site within the proposed Public Open Space for the development.	Present a submission to the CoR		Pre-Construction	EPA CoR	Before clearing/construction activities commence	CLD	13 December 1995
297: P4	Fire	Protect against Bushfire	By providing and maintaining a network of firebreaks and access tracks until the CoR takes on this responsibility	Report on this under M8	Overall	EPA DEP	Until the CoR takes on this responsibility	CLD	Fire Management Plan for the Golden Bay LSP Area was approved by the CoR in March 2012.
297: P5	Reticulated sewerage and stormwater drainage:	Provide reticulated sewerage and stormwater drainage designated to infiltrate stormwater into the soil within the development site.	To the satisfaction of the Minister for Planning and the CoR	Report on this under M8	Construction	EPA Minister for Planning CoR	During provision of services within the development	CLD	A LWMS has been prepared for the LSP Area and approved by the DWER and the CoR. UWMPs will be prepared in accordance with the LWMS for each stage of subdivision.
297: P6	Bandicoots	Liaise with CALM regarding the presence of bandicoots at Golden Bay and examine feasibility of relocating bandicoots if required by CALM.	Duplicated by M5		Pre-Construction	EPA CALM	Prior to any disturbance of the vegetation at Golden Bay	CLD	13 December 1995

Appendix 3

APPENDIX 4

FORESHORE MANAGEMENT PLAN MANAGEMENT ACTION TABLE

FORESHORE MANAGEMENT PLAN

MANAGEMENT COMMITMENTS AND RESPONSIBILITIES

Compliance Status: C = Compliant, CLD = Completed, NC = Non – compliant, NR = Not Required at this stage.

Task	Responsibility	Timeframe FMP Stages	Priority	Status
Locate roads, access tracks and DUPs, and the Coastal node along existing routes where possible, or realign them to move through areas of disturbed vegetation	Developer	Stage 4	2	CLD
Erect temporary fencing between the Foreshore Reserve vegetation and proposed development	Developer	Stage 2	1	C
Survey and peg the Foreshore Reserve area to ensure this is protected from potential impacts of subdivision development	Developer	Stage 2	1	CLD
Replace temporary fencing in appropriate areas with a permanent barrier once earthworks have been completed, to prevent unauthorised access to areas of native vegetation (embedded limestone and native vegetation can be used for this purpose)	Developer	Stage 3	3	NR
Erect interpretative signage on access paths near the TEC to inform DUP users of the conservation value of the vegetation	Developer	Stage 4	3	NR
Maintain grassed parkland area, toilets and showers, access paths, DUPS and fences.	Developer (2 years post- construction)	Stage 3-5	3	C

Appendix 4

	then City of Rockingham			
Transfer of proposed Foreshore Reserve to public ownership (to the City of Rockingham)	Developer	Post Stage 5	3	NR
Machinery and vehicles will use the cleared, degraded areas for access, and must be clean on entry to the site.	Developer	Stage 2-5	2	C
Vegetation clearing will be undertaken in weather conditions that are conducive to effective dust control.	Developer	Stage 2-5	1	C
Wind-fencing will be used as required in conjunction with water sprays and tankers to control and limit excessive dust from earthworks operations and roads.	Developer	Stage 2-5	2	C
The size of soil stockpiles will be limited and water or stabilising agents used to control dust.	Developer	Stage 2-5	2	C
Soil stabilisation methods will be used to reduce the risks associated with wind erosion through the use of mulches, dust suppression agents or by revegetation as appropriate.	Developer	Stage 2-5	2	C
Work will be planned to ensure construction or stabilisation follows demolition wherever possible.	Developer	Stage 2-5	2	C
Dust suppression equipment and/or agents will be regularly inspected and maintained as required to prevent unacceptable dust emissions.	Developer	Stage 2-5	2	C
Regular inspections of adjacent roads will be undertaken for dust creating materials.	Developer	Stage 2-5	2	C

Appendix 4

Excessive build-up of mud, debris or any other deleterious matter deposited on any road used for access to or egress from the project site will be removed.	Developer	Stage 2-5	2	C
Construction staff will be made aware of issues relevant to dust control and will be familiar with the requirements prescribed in this management plan.	Developer	Stage 2-5	2	C
Revegetate areas not likely to be impacted during construction as indicated in Figure 5	Developer	Stage 1	1	C
Apply brush to large dune "blowout" area	Developer	Stage 1-3	1	NR
Revegetate areas impacted during construction with species consistent with City of Rockingham's *Coastal Rehabilitation Policy* (CoR, 2002a)	Developer	Stage 2-5	2-3	C
Implement a monitoring program using visual inspections and photographs to monitor the progress of revegetation plans.	Developer (2 years post- construction) then City of Rockingham	Stage 1-5 Monitoring will be undertaken on a six-monthly basis, reviewed annually	3	C
Replace failed plants if coverage is not adequately achieved.	Developer (2 years post- construction) then City of Rockingham	As required, on a yearly basis post-construction	3	C
Carry out a visual inspection onsite to determine the success of weed control applied as determined in above task and establish a weed control program for the following two years.	Developer	Stage 2-5	2	C

Appendix 4

		Six monthly following initial weed management		
Carry out the weed control program devised in the above task. Potentially regular spot-spraying or removal by hand, done periodically over several years.	Developer (2 years post- construction) then City of Rockingham	Stage 2-5 Pre-, during and post-construction	3	C
Erect a dog-proof fence between the residential subdivision and the Foreshore Reserve to protect Bandicoots within the conservation areas from domestic pets and feral animals.	Developer	Stage 2 During Construction	2	NR
Construct fauna access underpasses beneath paths intersecting known Bandicoot habitat vegetation.	Developer	Stage 3	2	NR
Ensure site crew are aware of the 24hr Wildcare Helpline number to call ((08) 9474 9055) in the case of wildlife being encountered during clearing of construction.	Developer	Stage 2-5	2	C
Erect signage indicating the conservation status of the Bandicoot nearby to their known habitat areas.	Developer	Stage 4	3	NR
Educate landowners on the effect of domestic animals on native fauna, such as by erecting signs addressing responsible pet ownership and protection of habitat for Bandicoot. Signs should also include information on the general biology of Bandicoots.	Developer (2 years post- construction) then City of Rockingham	Stage 3-5	2	NR
Consider seeking community consent for the trapping of cats (particularly after Bandicoot breeding) within conservation areas in the Foreshore Reserve	Developer (2 years post- construction)	Ongoing	3	NR

Appendix 4

	then City of Rockingham			
Conserve and rehabilitate any good quality, dense wetland habitat which is planned for protection and provides protection for Bandicoots. The addition of further vegetation and cover (such as hollow logs) may assist with the survival of Bandicoot within protected areas at the Golden Bay site. (Such management actions should continue in parallel with the population monitoring.)	Developer (2 years post- construction) then City of Rockingham	Ongoing	1	C TEC19a Photo Point Monitoring Survey
Undertake an annual bandicoot trapping survey of seven nights in spring and autumn each year within the Foreshore Reserve (targeting conservation areas with known Bandicoot habitat).	Developer	Stage 2-5 During construction and for a period of 2 years post-construction.	1	C Bandicoot Monitoring Surveys
Continue to rehabilitate areas degraded as a result of construction and implement weed control.	Developer (2 years post- construction) then City of Rockingham	Ongoing	3	C
Removal of debris from bandicoot underpasses to prevent blockages.	Developer (2 years post- construction) then City of Rockingham	Ongoing (monthly)	3	NR
Remove all rubbish from conservation areas.	Developer (2 years post- construction) then City of Rockingham	Ongoing (monthly)	3	NR

Appendix 4

Have regard to the Aboriginal Heritage site reserve boundary and erect signage to indicate the significance of the site.	Developer	Stage 1-5 Construction	2	C
Ensure adequate provision of emergency vehicle access through the Foreshore Reserve.	Developer	Ongoing	2	C
Provide suitable drainage infrastructure such as soakwells for hardstand areas (e.g. Car parks)	Developer	Stage 2-5 Construction	2	C
Provision of passive surveillance such as lighting within the Foreshore Reserve.	Developer	Stage 2-5 Construction	2	C

Appendix 4

APPENDIX 5

TEC19A PHOTO POINT MONITORING REPORT

GOLDEN BAY FORESHORE RESERVE

2022 VEGETATION PHOTO POINT MONITORING REPORT

Prepared for:	Peet Golden Bay Pty Ltd and Department of Communities
Report Date:	30 August 2023
Version:	1
Report No.	2023-777

Appendix 5

pgv ENVIRONMENTAL

CONTENTS

Contents i

List of Attachments ii

1 INTRODUCTION 1

1.1 Background 1

1.2 Location 1

1.2.1 Foreshore Reserve Description 1

1.2.2 Foreshore Reserve Ecological Values 1

1.3 Report Purpose 2

2 EXISTING ENVIRONMENT 3

2.1 Topography 3

2.2 Wetlands 3

2.3 Vegetation 3

2.3.1 Vegetation Types 3

2.3.2 Vegetation Condition 4

3 MONTORING RESULTS 6

3.1 Photo Point Monitoring 6

3.2 Condition Assessment Method 6

3.3 Condition Assessment Results 8

3.4 Photo Point Monitoring Results 12

3.4.1 Site 1 13

3.4.2 Site 2 ..... **Error! Bookmark not defined.**

3.4.3 Site 3 ..... **Error! Bookmark not defined.**

3.4.4 Site 4 ..... **Error! Bookmark not defined.**

3.4.5 Site 5 ..... **Error! Bookmark not defined.**

3.4.6 Site 6 ..... **Error! Bookmark not defined.**

3.4.7 Site 8 ..... **Error! Bookmark not defined.**

4 CONCLUSIONS 27

5 REFERENCES 28

Appendix 5

LIST OF ATTACHMENTS

Tables

Table 1: Photo Point Coordinates

Table 2: Condition Indicators

Table 3: Condition Assessment

Plates

Plate 1: TEC19a Vegetation

Plate 2: Site 3 Area regeneration after cleared for fire management purposes

Plate 3: Site 1 Year 2015

Plate 4: Site 1 Year 2016

Plate 5: Site 1 Year 2017

Plate 6: Site 1 Year 2018

Plate 7: Site 1 Year 2019

Plate 8: Site 1 Year 2020

Plate 9: Site 1 year 2021

Plate 10: Site 1 Year 2022

Plate 11: Site 2 Year 2015

Plate 12: Site 2 Year 2016

Plate 13: Site 2 Year 2017

Plate 14: Site 2 Year 2018

Plate 15: Site 2 Year 2019

Plate 16: Site 2 Year 2020

Plate 17: Site 2 Year 2021

Plate 18: Site 2 Year 2022

Plate 19: Site 3 Year 2015

Plate 20: Site 3 Year 2016

Appendix 5

Plate 21: Site 3 Year 2017

Plate 22: Site 3 Year 2018

Plate 23: Site 3 Year 2019

Plate 24: Site 3 Year 2020

Plate 25: Site 3 Year 2021

Plate 26: Site 3 Year 2022

Plate 27: Site 4 Year 2015

Plate 28: Site 4 Year 2016

Plate 29: Site 4 Year 2017

Plate 30: Site 4 Year 2018

Plate 31: Site 4 Year 2019

Plate 32: Site 4 Year 2020

Plate 33: Site 4 Year 2021

Plate 34: Site 4 Year 2022

Plate 35: Site 5 Year 2015

Plate 36: Site 5 Year 2016

Plate 37: Site 5 Year 2017

Plate 38: Site 5 Year 2018

Plate 39: Site 5 Year 2019

Plate 40: Site 5 Year 2020

Plate 41: Site 5 Year 2021

Plate 42: Site 5 Year 2022

Plate 43: Site 6 Year 2015

Plate 44: Site 6 Year 2016

Plate 46: Site 6 Year 2017

Plate 47: Site 6 Year 2018

Plate 48: Site 6 Year 2019

Plate 49: Site 6 Year 2020

Appendix 5

Plate 50: Site 6 Year 2020

Plate 51: Site 6 Year 2020

Plate 52: Site 8 Year 2015

Plate 53: Site 8 Year 2016

Plate 54: Site 8 Year 2017

Plate 55: Site 8 Year 2018

Plate 56: Site 8 Year 2019

Plate 57: Site 8 Year 2020

Plate 58: Site 8 Year 2021

Plate 59: Site 8 Year 2022

Figures

Figure 1: Site Location

Figure 2: TEC19a Locations

Appendices

Appendix 1: Vegetation Photo Point Monitoring Proforma

Appendix 2: Site Photos

Appendix 3: Groundwater Levels in Wetland Bores

Appendix 5

1 INTRODUCTION

1.1 Background

The urban development of Lots 2 and 3, Golden Bay was subject to a Public Environmental Review (EPA Assessment 604) and was approved in Ministerial Statement 297 in January 1993 (Appendix A). Ministerial Statement 297 contains three conditions relevant to the Foreshore Reserve at Golden Bay as follows:

> *Condition 3-1 The proponent shall provide a foreshore reserve for the conservation and recreation which:*
>
> > *1 Protects the Peelhurst wetlands and the Southern Brown Bandicoot (Isoodon obesulus) population; and*
> >
> > *2 Includes landscape and recreation values at least equivalent to this proposal which is within System 6 Recommendation M106 Area.*
>
> *Commitment P-2 The proponent will prepare a Management Plan for the Coastal Reserve at Golden Bay prior to development commencing. This will be done to the satisfaction of the DPUD* [now Department of Planning, Lands and Heritage] *and the Local Authority.*

1.2 Location

The Golden Bay Foreshore Reserve (the study area) is situated 50km south of Perth and 16km south of the Rockingham Town Centre, within the City of Rockingham (Figure 1). The site is bounded by Secret Harbour to the north, the developing residential area on Lots 2 Warnbro Sound Avenue to the east and the existing Golden Bay Township to the south.

1.2.1 Foreshore Reserve Description

The Foreshore Reserve covers an area of approximately 10.61ha, is 800m in length and incorporates the beach, foredune and near-coastal dune systems. The width of the reserve from the back of the beach to its eastern extent ranges between approximately 400m (centre), 200m (southern end) and 250m (northern end). The western boundary of the reserve is marked by the high-water mark, the northern and southern boundaries in line with the northern and southern Lot 2 property boundaries and the eastern boundary marks the western limit of urban zoning. The extent of the reserve is shown in Figure 3.

1.2.2 Foreshore Reserve Ecological Values

The Foreshore Reserve contains wetlands that belong to the Peelhurst suite of wetlands. These wetlands form in low lying depressions within the Quindalup Dunes which have intercepted the water table and are typically small, seasonally inundated sumplands or seasonally wet damplands. The Golden Bay wetlands have been listed as Conservation Category in the *Geomorphic Wetlands of the Swan Coastal Plain* database.

Appendix 5

The Threatened Ecological Community (TEC) 19a *Sedgelands in Holocene Dune Swales* is located in all the wetlands in the Foreshore Reserve at Golden Bay. This TEC is listed as "Critically Endangered" under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and is also recognised as a TEC at State level.

The vegetation in the Foreshore Reserve supports a population of Southern Brown Bandicoot (*Isoodon fusciventer*). Bandicoots have been identified as a species of state significance and are listed as a Priority 5 species by the Department of Biodiversity, Conservation and Attractions (DBCA).

An indigenous heritage site (DIA 2519) is located in the southern end of the Foreshore Reserve.

1.3 Report Purpose

A Foreshore Management Plan (FMP) was prepared for the study area by the developers of Lot 2 Warnbro Sound Ave (Peet Golden Bay Pty Ltd and Department of Housing now Department of Communities) and approved on 30 March 2012. An addendum to the FMP to address the interface between the development and foreshore reserve was submitted and approved by the OEPA on 29 September 2016.

The FMP contained a commitment to monitor the health of the vegetation in the wetlands using permanent photo points.

The initial photo point monitoring assessment was conducted in October 2012. This report documents the methods and results of the annual photo point monitoring undertaken in the Golden Bay Foreshore Reserve over the period from 2012 to 2022.

The objectives of the photo point monitoring report are to:

- Provide a qualitative assessment of the condition of the TEC19a vegetation in the wetlands;
- Assess any requirement for weeding;
- Assess any requirement for grazing control; and
- Determine if any erosion control is required.

Appendix 5

2 EXISTING ENVIRONMENT

2.1 Topography

The topography of the Foreshore Reserve ranges from 1 to 10m AHD. The dunes closest to the coast are part of a recent parallel dune ridge system with dune crests up to 5-6m AHD. The eastern half of the Foreshore Reserve contains a low linear flat swale at an elevation of 1-2m AHD with some taller dunes up to 10m AHD.

2.2 Wetlands

The eastern half of the Foreshore Reserve contains a number of small wetlands within the flat swale directly behind the frontal dunes. The wetlands are described as sumplands and contain shallow freshwater above-ground in spring during an average rainfall season. The wetlands are rated as Conservation Category wetlands.

2.3 Vegetation

The Foreshore Reserve was subject to a bushfire on 1 January 2016. The fire was reported as being ignited by fireworks/boat flares. The area of the Foreshore Reserve impacted by the fire was estimated to be approximately 7ha. The northern section was burnt in patches and the eastern part of the central section was largely burnt.

The area burnt by the January 2016 bushfire was monitored in accordance with the FRP to assess the progress of regeneration. The monitoring program concluded in October 2018 and it was determined that supplementary planting would not be required. The Post Fire Vegetation Monitoring Survey results are provided in Appendix 4.

2.3.1 Vegetation Types

A variety of coastal Quindalup vegetation types occur in the Foreshore Reserve as listed below:

Western Half

- *Spinifex hirsutus* Grassland: Located on the foredune with *Spinifex longifolius, Tetragonia decumbens* and *Cakile maritima* present on the seaward facing slopes and *Ficinia nodosa* and *Carpobrotus virescens* frequent near the crest and leeward sides.
- *Olearia axillaris* Shrubland: Located immediately behind the foredune and forms a wide band parallel to the coast, containing *Cassytha* sp., *Pelargonium capitatum* and *Trachyandra divaricata*. It grades into the *Spyridium globulosum* Open Heath.
- *Spyridium globulosum* Open Heath: Located on the lower dunes and containing *Acacia cyclops, Hibbertia cuneiformis, Alyxia buxifolia, Pelargonium capitatum* and the creeper *Hardenbergia comptoniana*.

Eastern Half

- *Acacia rostellifera/Spyridium globulosum* Closed Shrub: An intermediate unit located in the central part of the site.

Appendix 5

- *Juncus kraussii* Sedgeland: Located within the eastern low linear flat swale in the wetland areas, containing *Baumea juncea, Centella asiatica, Ficinia nodosa, Dampiera alata* and *Lepidosperma gladiatum.* Mature Paperbark trees (*Melaleuca rhaphiophylla* and *Melaleuca cuticularis*) also occur in the wetlands. The 2016 fire caused a multitude of *M. rhaphiophylla* seedlings to germinate from one mature tree in one of the wetlands in the reserve.
- *Spyridium globulosum* Closed Heath: Making up the majority of the transitional vegetation on slightly higher ground within the swale, it contains similar species to the *Spyridium globulosum* Open Heath on the low dunes and additionally a dense ground coverage of the Sword Sedge *Lepidosperma gladiatum*.

The *Juncus kraussii* Sedgeland vegetation type generally describes the vegetation in the wetlands.

Plate 1: TEC19a Vegetation



2.3.2 Vegetation Condition

The vegetation in most of the Foreshore Reserve was rated as mostly being in Excellent condition with only a few tracks through it. Some wetland areas had previously been impacted by off road vehicles. These tracks have been closed off to allow for natural regeneration of the wetlands.

A weed survey of the Foreshore Reserve conducted by PGV Environmental in May 2015, identified the most prevalent introduced species in the area as Rose Pelargonium (*Pelargonium capitatum*) and False Onion Weed (*Trachyandra divaricata*). Both species were more common on the western part of the Foreshore Reserve on sand dunes than in the eastern swales. Hares Tail Grass *(Lagurus ovatus)* and Geraldton Carnation Weed *(Euphorbia terracina)* were also present in parts of the Foreshore Reserve.

The wetlands on the site contained few weeds.

2.4 Native Fauna

The Foreshore Reserve at Golden Bay contains a population of Quenda (*Isoodon fusciventer*). The size and health of the Quenda population has been monitored by the developers for six years. The number of Quenda recorded during surveys in the foreshore reserve declined in 2016 after much of the bushland was burnt which resulted in reduced habitat and an increased exposure of Quenda to predators. Since 2016, the number of bandicoots has increased. This is partially a result of ten additional individuals being relocated into the Foreshore Reserve from other sites in East Rockingham, Florida and Madora Bay, but also post-fire recovery of the habitat. The Quenda population now has Sarcoptic Mange.

The Foreshore Reserve contains a population of Western Grey Kangaroos (*Macropus fuliginosus*). The condition of the wetland vegetation is being adversely impacted by kangaroos moving through or resting in the dense sedgelands. It is anticipated there will be a progressive increase in the kangaroo population.

2.5 Pest Fauna

The Foreshore Reserve contains an abundance of rabbits as evidenced by the quantity and distribution of scats and diggings. Foxes and cats are also common in the Foreshore Reserve.

Fox and cat trapping were undertaken post the 2016 fire event and additional cat trapping is undertaken during the biannual Quenda monitoring surveys. The number of foxes has increased, and it is likely that the Sarcoptic Mange, which can be carried by foxes, has infected some of the Quenda. During 2020, only one male Quenda was found to have Sarcoptic Mange, which is an improvement on the previous year.

No foxes or cats were caught during control program in Autumn 2020. A broad scale RHDV K5 deployment was undertaken to remove small pockets of rabbits during Autumn 2020 (TE, 2020).

Appendix 5

3 MONTORING RESULTS

3.1 Photo Point Monitoring

Photo point monitoring was undertaken on 15 October 2022 at the seven monitoring sites established in the wetland vegetation in 2012 (Plate 1). Sites 5 and 7 have been combined into one site due to their proximity (4m apart).

Four photos (east, north, west, south) were taken from the permanent photo points which are marked with a metal dropper and flagging tape. The location of markers is recorded in eastings and northings as shown in Table 1 and shown in Plate 1.

Table 1: Photo Point Locations.

Site	Eastings	Northings
1	382545	6411987
2	382527	6412049
3	382544	6412057
4	382501	6412185
5	382469	6412279
6	382507	6412293
8	382458	6412346

3.2 Condition Assessment Method

The condition of the vegetation in the wetland areas was assessed using key indicators to facilitate comparison between the results from different years. A number of indicators were considered in the condition assessment, each of which were allocated a score using a three-point scoring system of 1 to 3 (Table 2). Relevant comments on condition indicators were also recorded as supplementary information. The scoring system will enable broad comparison over time between results, however, due to the subjective nature of the method, the scores are indicative only.

The nature of many of the indicators for the condition assessment is such that they will not change over the short term, for example surface water and fire history. The attributes most likely to change over time include weed invasion, grazing and flattening.

A standard proforma is used to document the condition assessment to ensure consistency across the subsequent monitoring events. The proforma is provided at Appendix 1.

Table 2: Condition Indicators

Indicator	Rating	Measure
Grazing	1	Severe/heavy
	2	moderate (limited but evident)
	3	nil very low
Clearing	1	30% +cleared
	2	10-30% cleared
	3	<10% cleared

Appendix 5

Indicator	Rating	Measure
Weeds	1	30% +cover
	2	1-30% cover
	3	<10% cover
Erosion	1	severe impacting >30% of site
	2	moderate (limited but evident)
	3	nil very low (minimal impact)
Fire History	1	<10 years
	2	10 to 20 years
	3	>20 years
Surface Water	1	Damp at Surface
	2	<10cm
	3	>10cm

Appendix 5

3.3 Condition Assessment Results

The results of the qualitative condition assessment for each monitoring point are provided in Table 3. The condition assessment photos are shown in Appendix 2.

Site 1 had an approximate water depth of 10cm significantly less than previous years. The remaining sites did not have any standing surface water and the surface was dry. Sites 3 and 6 were damp at the surface but did not contain any above ground water. The groundwater levels (JHD, 2020) in the ground water monitoring bore WB01 in the foreshore wetlands showed maximum levels of around 1.2m AHD in October 2020 (Appendix 3). Ground Water monitoring bore WB02 had maximum levels of 1.23m AHD in October 2020 (Appendix 3). The ground water levels were the same as Year 2019 which were slightly lower than previous years. Annual rainfall was slightly lower for these two years in comparison to years 2017-18.

The number of kangaroo trails and resting places have increased in all wetlands. Wetlands 4 and 5 show considerable flattening of the sedges where the kangaroos rest.

Weed encroachment has increased along the interface with development and along the interface with the foreshore recreation area.

Erosion rating has not changed significantly since 2012.

Site 3 is a wetland that has had a 4WD track through it for many years and, as such, started with a low condition score and high rating for clearing. The sedge *Isolepis nodosus* is regenerating on the track and the vegetation to the north is recovering well. There is some evidence of an increase in weed species such as *Pelargonium capitatum* (Ro) *Euphorbia terracina* (Geraldton Carnation Weed), *Cynodon dactylon* (Couch Grass) *and Carpobrotus edulis* (Hottentot Fig) to the north of the wetland.

Plate 2: Site 3 Area regeneration after cleared for fire management purposes



Appendix 5

Table 3: Condition Assessment (2020)

Appendix 5

Condition Attribute	Site	1	2	3	4	5	6	8
Grazing/flattening by rabbits or kangaroos	2022	-	-	-	-	-	-	-
	2021	2	2	3	2	3	2	3
	2020	2	2	3	2	3	2	3
	2019	3	2	3	1	1	2	3
	2018	2	2	3	2	2	2	3
	2017	2	2	3	2	2	2	3
	2016	2	3	3	3	3	3	3
	2015	2	2	2	2	2	3	3
	2012	1	2	3	3	3	3	2
Clearing	2022	3	3	3	3	3	3	3
	2021	3	3	3	3	3	3	3
	2020	3	3	3	3	3	3	3
	2019	3	3	2	3	3	3	3
	2018	3	3	1	3	3	2	3
	2017	3	2	1	3	3	2	3
	2016	3	1	1	2	2	2	2
	2015	3	3	1	3	3	2	3
	2012	3	3	1	3	3	1	2
Weed Invasion	2022	-	3	3	3	3	3	3
	2021	3	3	3	3	3	3	3
	2020	3	3	2	3	3	3	3
	2019	3	3	2	3	3	3	3
	2018	3	2	2	3	3	2	3
	2017	3	2	2	3	3	2	3
	2016	3	2	2	2	2	2	2
	2015	3	3	2	3	2	2	3
	2012	3	3	2	3	3	2	2
Erosion	2022	-	3	3	3	3	3	3
	2021	3	3	3	3	3	3	3
	2020	3	3	3	3	3	3	3
	2019	3	3	3	3	3	3	3
	2018	3	3	2	3	3	3	3
	2017	3	3	2	3	3	3	3
	2016	3	3	1	3	3	3	3

Appendix 5

	2015	3	3	2	3	3	3	3
	2012	3	3	1	3	3	2	2
Fire History	2022	2	1	1	1	1	1	1
	2021	2	1	1	1	1	1	1
	2020	2	1	1	1	1	1	1
	2019	2	1	1	1	1	1	1
	2018	2	1	1	1	1	1	1
	2017	2	1	1	1	1	1	1
	2016	2	1	1	1	1	1	1
	2015	2	2	2	2	2	1	2
	2012	2	2	2	2	2	2	2
Surface Water	2022	-	1	2	2	2	1	2
	2021	2	1	1	1	1	1	1
	2020	2	1	1	1	1	1	1
	2019	3	1	1	2	2	1	2
	2018	3	3	1	2	3	1	3
	2017	3	2	1	3	3	1	2
	2016	2	1	1	1	1	1	1
	2015	1	1	1	1	1	1	1
	2012	2	1	1	1	2	1	2

Appendix 5

3.4 Photo Point Monitoring Results

The full set of photos for each site year 2022 is provided in Appendix 2.

Appendix 5

3.4.1 Site 1

Site 1 will be monitored from drone from year 2022 due to the vegetation becoming too thick to access the wetland. Comparison of photos from 2015, 2016, 2017, 2018, 2019 and 2020 showed that there was similar damage by kangaroos passing through and/or sleeping in the Site 1

Plate 3: Year 2015



Plate 4: Year 2016



Plate 5: Year 2017



Plate 6: Year 2018



Plate 7: Year 2019



Plate 8: Year 2020



Plate 9: Year 2021



Plate 10: Year 2022



Appendix 5

3.4.2 Site 2

Comparison of photos from 2015, 2016, 2017, 2018, 2019, 2020 and 2021 shows the site has recovered fully from the fire. The sedges in the wetland have regrown to approximately 50cm in height. The wetland contained standing water less than 10cm. There was less evidence of kangaroos passing through the wetland than in previous years.

Plate 11: Year 2015



Plate 12: Year 2016



Plate 13: Year 2017



Plate 14: Year 2018



Plate 15: Year 2019



Plate 16: Year 2020



Appendix

Plate 17: Year 2021



Plate 18: Year 2022



Appendix 5

3.4.3 Site 3

Comparison of photos from 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022 shows the sedges have now covered the track and the vegetation to the south is encroaching further into the track.

Plate 19: Year 2015



Plate 20: Year 2016



Plate 21: Year 2017



Plate 22: Year 2018



Plate 23: Year 2019



Plate 24: Year 2020



Plate 25: Year 2021



Plate 26: Year 2022



Appendix 5

3.4.4 Site 4

Comparison of photos from 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022 show the vegetation within the wetland has recovered completely from the fire event. The sedges in the wetland have regenerated and were approximately 40-50cm in height. The wetland contained surface water less than 10cm deep on the day of the survey. There was less evidence of kangaroo activity passing through the wetland.

Plate 27: Year 2015



Plate 28: Year 2016



Plate 29: Year 2017



Plate 230: Year 2018



Plate 31: Year 2019



Plate 32: Year 2020



Appendix C

Plate 33: Year 2021



Plate 34: Year 2022



Appendix 5

3.4.5 Site 5

Comparison of photos from 2015, 2016, 2017, 2019, 2020, 2021 and 2022 showed less kangaroo activity. There was surface water to 10cm and sedges were overall healthier than the previous year.

Plate 35: Year 2015



Plate 36: Year 2016



Plate 37: Year 2017



Plate 38: Year 2018



Plate 39: Year 2019



Plate 40: Year 2020



Unpenned

Plate 41: Year 2021



Plate 42: Year 2022



Appendix 5

3.4.6 Site 6

Comparison of photos from 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022 showed no kangaroo activity and the original track is completely covered. The surface was dry.

Plate 43: Year 2015



Plate 44: Year 2016



Plate 45: Year 2017



Plate 46: Year 2018



Plate 47: Year 2019



Plate 48: Year 2020



Plate 49: Year 2021



Plate 50: Year 2022



Appendix 5

3.4.7 Site 8

Comparison of photos from 2015, 2016, 2018, 2019, 2020, 2021 and 2022 shows less disturbance than previous years and there was surface water to 10cm deep.

Plate 51: Year 2015



Plate 52: Year 2016



Plate 53: Year 2017



Plate 54: Year 2018



Plate 55: Year 2019



Plate 56: Year 2020



Plate 57: Year 2021



Plate 58: Year 2022



Appendix 5

4 CONCLUSIONS

The photo monitoring of vegetation in the wetlands of the Golden Bay Foreshore Reserve shows the vegetation regeneration after the impact of the fire on 1 January 2016. The sedges in the wetlands have regrown and the surrounding vegetation is at pre-fire density and condition.

The impact of the fire in increasing weeds in the fire-affected areas is being monitored and, if required, weed control will be implemented. Currently, monitoring has not detected an increase in weed density or species richness after the fire. With the rapid recovery of the native vegetation the status of weeds in the wetlands is unlikely to change.

The wetlands were all wetter than previous years which correlates with the highest groundwater levels recorded since monitoring commenced. Wetland 1, 2, 4, 5 and 8 had surface water at the time of survey.

There is decreased evidence of kangaroos resting and passing through wetlands 2, 4, 5, and 6. The impact of kangaroos on the vegetation will be monitored further. If the impact is considered to be having long-term adverse effects, a programme to remove the kangaroos from the Foreshore Reserve will need to be investigated. Any kangaroo management in the Foreshore Reserve, however, will need to be a collaborative effort between all developers in the area, the City of Rockingham and the Department of Biodiversity, Conservation and Attractions.

Appendix 5

5 REFERENCES

JDA Consultant Hydrologists (2023). *Golden Bay – Wetland Groundwater Levels to end of 2022.*

PGV Environmental (2011). *Lots 2 and 3 Warnbro Sound Avenue Golden Bay Foreshore Management Plan.* Prepared for the Department of Housing. Report No. 2011-13 V6.

Terrestrial Ecosystems (2022a and b). *Quenda Monitoring Golden Bay – Autumn and Spring 2022.* Reports prepared for Peet Limited.

Appendix 5

FIGURES

Appendix 5

PINPOINT CARTOGRAPHICS (08) 9562 7136 2020-526-f01.dgn

382 250mE
382 500mE
382 750mE
6 412 500mN
6 412 250mN
6 412 000mN
501 R 27066
500 R 27066
502 R 27066
503
2486 R 34664
9029
R 52131
R 35364
1 2 3 4 5 6 8

N

0 20 40 60 80 100m

SCALE 1 : 3 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Proposed Subdivision Boundary
- Coffey Environments and DEC Approved TEC19a Boundary October 2010

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.

pgv ENVIRONMENTAL

Department of Housing and Peet Golden Bay Pty Ltd
2019 PHOTO POINT MONITORING REPORT
LOT 2 WARNBRO SOUND AVENUE, GOLDEN BAY FORESHORE RESERVE

Drawn: B. Heath | Date: 26 Aug 2020
Job: 10004 Rpt: 2020-526 | Revision: A

PHOTO POINT MONITORING LOCATIONS

Figure 1

APPENDIX 1

SITE ASSESSMENT PROFORMA

Appendix 5

Site No.	Recorder (s)		Date	
GPS Point	Easting		Northing	
Fencing: fully/partial/not fenced	Current Land Use			
Monitoring Photos No. (taken from Stake)	East	South	West	North
Position of Marker in TEC				
Attribute of Site	**Score**	**Comments**		
Grazing				
1 = severe/heavy				
2= moderate (limited but evident)				
3=nil very low				
Clearing				
1 = 30% + cleared				
2 = 10-30% cleared				
3 = <10% cleared				
Weed Invasion				
1 = 30% + cover				
2 = 1--30%				
3 = <10%				
Erosion				
1 = severe impacting >30% of site				
2= moderate (limited but evident)				
3=nil very low (minimal impact)				
Fire History				
1 = <20 years				
2 = 20-50 years				
3 = > 50 years				
Surface Water				
1 = Damp at surface (no standing water)				
2 = < 10cm				
3 = >10cm				

Appendix 5

APPENDIX 2

SITE PHOTOS

Appendix 5

Site Photos 2021 – Taken from permanent marker in each of the wetlands

Site 1

382545 m E **6411987 m S**

-32 25 22.93 **115 45 2.08**

Plate 1: Looking East



Plate 2: Looking south



Plate 3: Looking west



Plate 4: Looking north



Appendix

Site 3

382527 m E 6412049 m N

32 25 21.10 115 45 1.90

Plate 5: Looking East



Plate 6: Looking south



Plate 7 Looking west



Plate 8: Looking north



Site 2

382544 m E 6412057 m S

32 25 20.61 115 45 2.79

Plate 9: Looking East

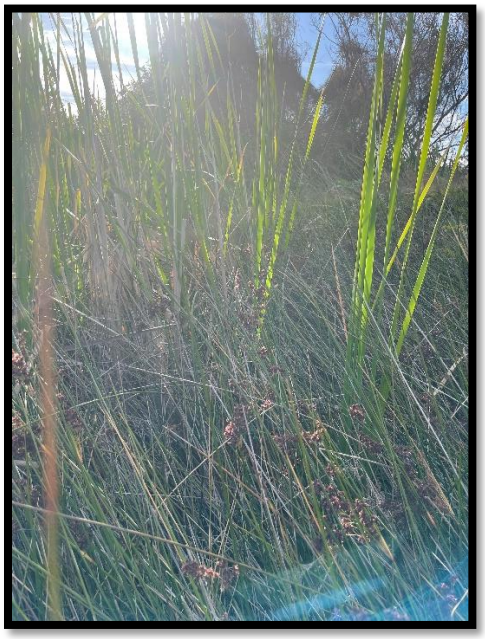


Plate 10: Looking south



Plate 11: Looking west



Plate 12: Looking north



Site 4

382501 m E 6412185 m S

32 25 16.6 115 45 1.03

Plate 13: Looking East



Plate 14: Looking south



Plate 15 Looking west



Plate 16: Looking north



Site 5 and 7 combined

382469 m E **6412279 m S**

32 25 13.6 **115 44 59.78**

Plate 17: Looking East



Plate 18: Looking south



Plate 19: Looking west



Plate 20: Looking north



Site 6 -

382507 m E **6412293 m S**

32 25 12.93 **115 45 1.5**

Plate 21: Looking East



Plate 22: Looking south



Plate 23 Looking west



Plate 24: Looking north



Site 8

382458.00 m E **6412346.00 m S**

Plate 29: Looking East

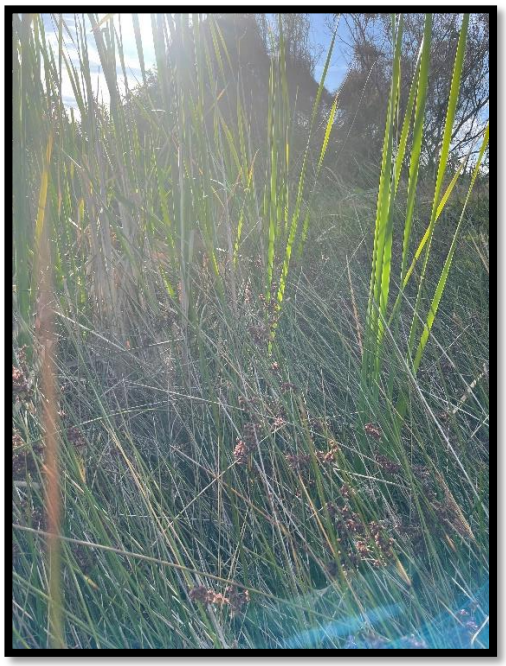


Plate 30: Looking south



Plate 31: Looking west



Plate 32: Looking north

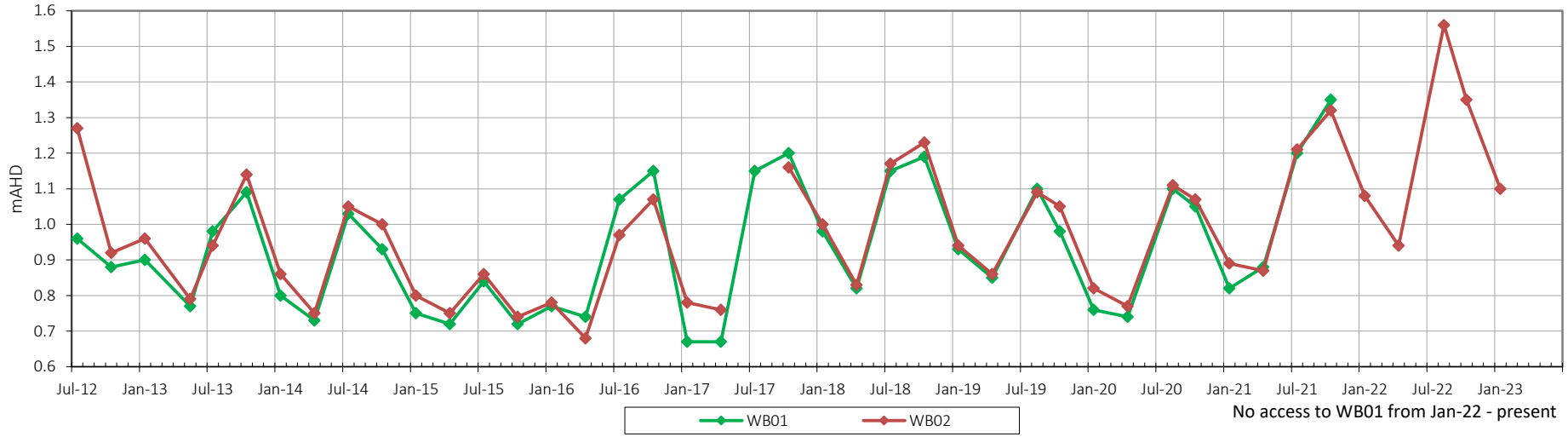


APPENDIX 3

GROUNDWATER LEVELS IN WETLAND BORES

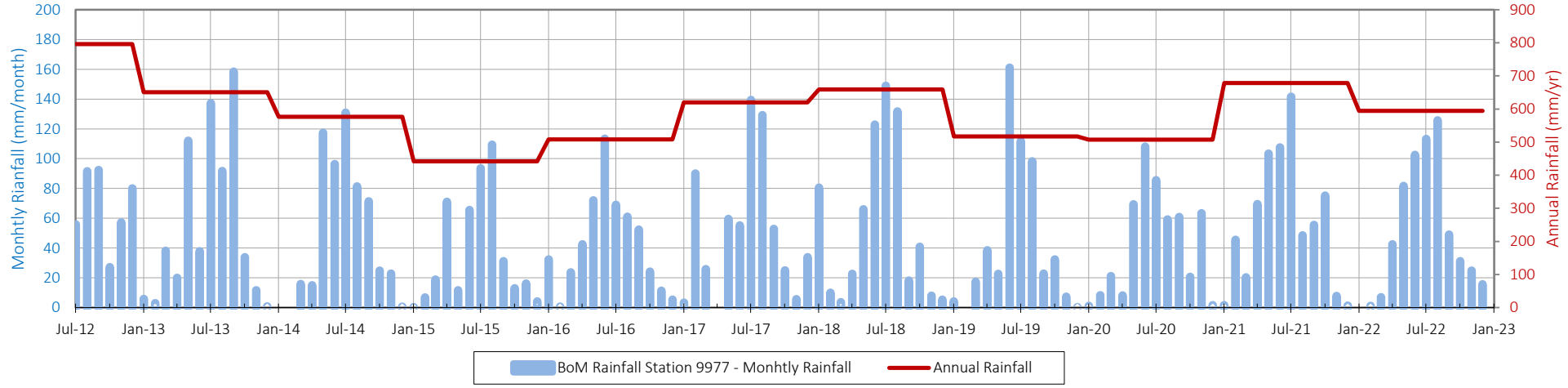
Wetland Bores - Groundwater Levels 2022

Groundwater Levels (mAHD)



No access to WB01 from Jan-22 - present

Rainfall (mm)



Job No. J7423

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Peet Golden Bay Pty Ltd and Housing Authority
Golden Bay Groundwater Monitoring

Figure 1: Groundwater Levels in Wetland Bores 2012 - 2022

APPENDIX 6

QUENDA MONITORING SURVEY REPORTS

Quenda Monitoring Golden Bay

Autumn 2023

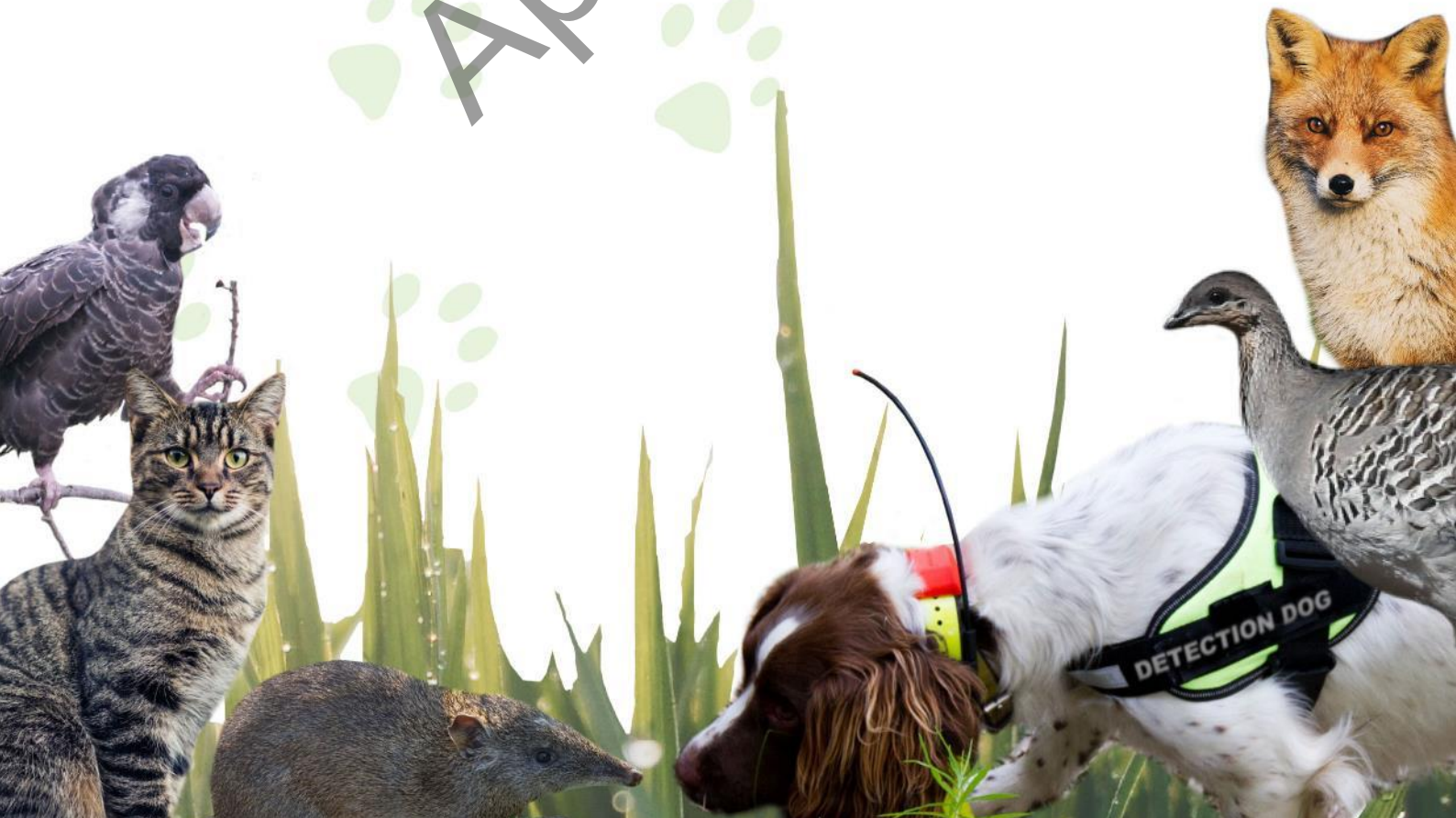
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Appendix 6



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REPORT CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION 1

1.1 Background 1
1.2 Scope of this Quenda survey for long-term monitoring 1

2. BIOLOGY AND ECOLOGY OF QUENDA 3

3. METHODOLOGY 5

3.1 Data analysis 5
3.2 Signs 5

4. RESULTS AND DISCUSSION 6

4.1 Survey monitoring 6
4.2 Status of the population 8
4.3 Western Grey Kangaroos 8
4.4 Rabbits 9
4.5 Reptiles 9

5. CONCLUSION 10

6. RECOMMENDATIONS 11

7. REFERENCES 12

Appendix 6

LIST OF PLATES

Plate 1. Sign placed near the end of an access track 5
Plate 2. Black Rat 7
Plate 3. Bobtail 7
Plate 4. Cat 7
Plate 5. Rabbit scats 7
Plate 6. Predatory activity 8
Plate 7. Kangaroos 8

LIST OF TABLES

Table 1. Number of Quenda in previous monitoring programs 2
Table 2. Number of Quenda in Autumn 2023 6

LIST OF FIGURES

Figure 1. Trapping sites 15

LIST OF APPENDICES

Appendix A. Quenda trapping results

Appendix 6

EXECUTIVE SUMMARY

Peet Ltd, on behalf of Peet Ltd and the Department of Housing, requested a follow up monitoring survey of the Quenda (*Isoodon fusciventer*) population in the Foreshore Reserve adjacent to Lot 2, Warnbro Sound Ave, Golden Bay (i.e. 'project area'). This follows on from an initial survey in spring 2012 and subsequent monitoring surveys in autumn and spring of 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022. Quenda (formerly part of the Southern Brown Bandicoot complex) monitoring is a requirement under the Ministerial Statement 150 and compliance reports are provided to the Office of the Environmental Protection Authority on an annual basis.

The Foreshore Reserve includes the foredune and swale, and the hinterland vegetation inland for about 400m from the ocean. The Foreshore Reserve includes a Conservation Category Wetland and a Threatened Ecological Community (TEC) that supported dense vegetation before it was burnt.

The project area was extensively burnt in January 2016 and the only unburnt habitat that remained was in the southern end of the Foreshore Reserve. Since the burn in January 2016, there has been significant regrowth of vegetation across the entire burnt area.

In June 2019, vegetation was cleared for the construction of a sealed road and grassed area in the foreshore dune area. The new sealed road enters from the southern end of the Foreshore Reserve, and there is now a large, cleared area between the wetland vegetation and foredunes. This area contains a playground and a formed track for bicycle riding, carparks at either end and two access tracks to the beach. In July 2020, vegetation was cleared for the construction of a drain on the southern boundary adjacent to Solstice Grove. Construction of this area continued in August 2021 to build a sealed road that connects the playground carpark to the northern end of Marillana Drive, and to extend the subdivision. As part of these construction programs, some areas that had previously been trapped for Quenda were cleared of vegetation.

Quenda abundance has declined in 2022-2023 compared with all previous surveys. The population at Golden Bay often fluctuates in response to a combination of factors, including predator control and resource availability, however, construction activity, loss of habitat, reduced overall native vegetation, particularly east of the reserve and increasing access of feral predators into the bushland through fragmentation will inevitably result in a reduced population.

There is historical evidence of breeding in the Quenda population, however, as discussed in previous reports, very few juveniles are entering the adult population, strongly suggesting predation on the smaller sized Quenda is a major problem. There was no evidence of mange found during the current survey and all but one individual was in good condition.

It is recommended that:

(1) a feral cat trapping program is undertaken on a twice-yearly basis until the Quenda population increases, and this may be combined with the City of Rockingham's annual trapping program;
(2) a fox trapping program is undertaken on a twice-yearly basis until the Quenda population increases, and this may be combined with the City of Rockingham's annual trapping program; and
(3) a rabbit reduction program using RHDV1 K5 is repeated in spring 2023.

Appendix 6

1. INTRODUCTION

1.1 BACKGROUND

Peet Ltd, on behalf of Peet Ltd and the Department of Housing, requested a follow up monitoring survey of the Quenda (*Isoodon fusciventer*) population in the Foreshore Reserve adjacent to Lot 2, Warnbro Sound Ave, Golden Bay (i.e. 'project area'). This follows on from an initial survey in spring 2012 and subsequent monitoring surveys in autumn and spring of 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022 (Terrestrial Ecosystems 2012, 2013b, a, 2014a, b, 2015a, b, 2016a, b, 2017b, a, 2018a, b, 2019a, b, 2020a, b, 2021a, b, 2022a, b). Quenda (formerly part of the Southern Brown Bandicoot complex) monitoring is a requirement under the Ministerial Statement 150 and compliance reports are provided to the Office of the Environmental Protection Authority on an annual basis.

The Foreshore Reserve includes the foredune and swale, and the hinterland vegetation inland for about 400m from the ocean. The Foreshore Reserve includes a Conservation Category Wetland and a Threatened Ecological Community (TEC) that supported dense vegetation before it was burnt.

The project area was extensively burnt in January 2016 and the only continuous unburnt habitat that remained was in the southern end of the Foreshore Reserve. Since the burn in January 2016, there has been significant regrowth of vegetation across the entire burnt area.

In June 2019, vegetation was cleared for the construction of a sealed road and grassed area in the Foreshore dune area. The new sealed road enters from the southern end of the Foreshore Reserve, and there is now a large, cleared area between the wetland vegetation and foredunes. This area contains a playground and a formed track for bicycle riding, car parks at either end and two access tracks to the beach. In July 2020, vegetation was cleared for the construction of a drain on the southern boundary adjacent to Solstice Grove. Construction of this area continued in August 2021, to build a sealed road that connects the playground carpark to the northern end of Marillana Drive, and to extend the subdivision. As part of these construction programs, some areas that we had previously trapped for Quenda were cleared of vegetation.

Due to the construction works, flooding in the wetland and the regrowth in vegetation across the whole of the Foreshore Reserve, the location of traps was changed for the spring 2022 survey and again for this survey, although we used the same number of traps and similar locations for this survey.

Appendix 6

1.2 SCOPE OF THIS QUENDA SURVEY FOR LONG-TERM MONITORING

The Foreshore Reserve will remain public open space and the developer has made a commitment to monitor the health of the Quenda population on a twice yearly basis during the construction and development stages (PGV Environmental 2011).

Coffey Environments recorded eight Quenda in the reserve during its survey in mid-February 2010 (PGV Environmental 2011). It was reported that Quenda preferred scrubby, often swampy vegetation with a dense understorey of cover up to one metre high. The Threatened Ecological Community and wetland areas within the Foreshore Reserve were considered suitable habitat to sustain a bandicoot population in the long-term (PGV Environmental 2011).

Multiple Quenda relocation programs have been undertaken for each stage of development prior to vegetation clearing from Lot 2, Warnbro Sound Ave and Lot 3, Dampier Drive as required under Ministerial Statement 150. These programs were implemented to minimise the impact of vegetation clearing on Quenda residing in these lots. All Quenda caught prior to the vegetation clearing program in July 2016 were relocated out of the monitoring area as there would have been insufficient habitat remaining to sustain this population given the area that had been burnt in January 2016.

The results of twenty-one previous monitoring surveys are shown in Table 1. This report provides the outcomes of the twenty-second monitoring survey of Quenda in the Foreshore Reserve.

Table 1. Number of Quenda in previous monitoring programs

	Spring 2012	Winter 2013	Spring 2013	Winter 2014	Spring 2014	Autumn 2015	Spring 2015	Autumn 2016	Spring 2016	Autumn 2017	Spring 2017	Autumn 2018	Spring 2018	Autumn 2019	Spring 2019	Autumn 2020	Spring 2020	Autumn 2021	Spring 2021	Autumn 2022	Spring 2022
# of indiv. captured	31	30	28	39	48	53	36	26	12	15	15	12	46	44	29	31	40	28	26	19	9
# of adult males	13	10	7	11	10	16	14	8	4	9	10	8	26	20	15	12	16	15	12	5	2
# of adult females	15	20	21	27	25	34	17	17	4	5	5	4	17	24	13	17	18	13	11	12	5
# of juvenile males	1			1						1						1	2				1
# of juvenile females	2					3	5		4				1			1	3		3	2	1
# juvenile of unknown sex					12																
Unknown sex and age					1								2								
Unknown age								1F							1F		1F				

* Notes -

Spring 2014 - there are 12 juveniles (less than 300g) and there was no information available on body weights
Autumn 2015 - 2 dead individuals included in table
Autumn 2016 – 2 females with no weight and 1 of them was an adult based on other measurements; the other one has no measurements recorded
Spring 2018 - 2 adults with no data, one escaped.
Spring 2019 - one male died (included in table) and 1 female with no measurements recorded
Spring 2020 – includes 4 individuals where the chip reader failed.

The January 2016 fire was followed by a reduction in the population of Quenda in the reserve. The autumn 2018 survey report (Terrestrial Ecosystems 2018a) indicated that the vegetation in the burnt area had regenerated and much of the burnt section of the Foreshore Reserve could now support Quenda. To supplement the low Quenda population in the reserve, Quenda were relocated into the foreshore reserve from vegetation clearing projects at sites in east Rockingham, Florida and Madora Bay. All relocated Quenda had a microchip and were measured in a similar manner to those at Golden Bay. It was noted that the Quenda population showed a marked decline in the spring 2022 survey.

Appendix 6

2. BIOLOGY AND ECOLOGY OF QUENDA

The Quenda (*I. fusciventer*) is a medium-sized, ground-dwelling marsupial that belongs to the Peramelidae family (Van Dyck and Strahan 2008, Travouillon and Phillips 2018). Populations of Quenda occur widely throughout southern Western Australia (Rees and Paull 2000, Van Dyck and Strahan 2008). In 2018, the Western Australian Southern Brown Bandicoot was elevated to a full species and is now commonly called a Quenda in WA (Travouillon and Phillips 2018).

Isoodon fusciventer was listed as a Schedule 1 species (Fauna that is rare or likely to become extinct) under the Western Australian *Wildlife Conservation Act 1950* until 1998. An increase in the population, which was attributed to the implementation of fox baiting throughout the state, meant that in 1998 Quenda was removed from the threatened species list. Quenda is now listed as a Priority 4 species ('Taxa in need of monitoring') on the Department of Biodiversity, Conservation and Attractions' (DBCAs) Priority Fauna List.

Quenda are found in the wetter sections of the south-west of Western Australia, mostly along the Swan Coastal Plain from the Moore River to Walpole and the Fitzgerald River area. Populations of Quenda are found in a variety of habitats in this region and appear to be able to survive a level of habitat destruction and live close to urban and industrial developments. Quenda prefer habitats with a dense shrub understorey up to one metre high, but they are found in a variety of habitats including Banksia, Eucalypt and Melaleuca woodlands, but often in close proximity to a wetland where the vegetation is often more dense (Stoddard and Braithwaite 1979, Ramalho et al. 2013). In areas of thick undergrowth, Quenda are able to establish runways that are difficult to detect beneath the interlocking overlying vegetation (Craven 1981). They are vulnerable to cat, fox and dog predation and are occasionally seen dead on the roads in urban environments, with the result that they are increasingly under threat due to the clearing of bushland leading to habitat fragmentation, bushland degradation and predation by introduced predators including foxes, cats and dogs (Friend 1991).

Quenda and its sister species, the Southern Brown Bandicoot which is found in the eastern states, are both nocturnal and diurnal, but are mostly active during the day early in the morning or late afternoon (Van Dyck and Strahan 2008). Individuals are mostly solitary, but with overlapping home ranges. The home range size of Quenda decreases with increasing population size (Broughton and Dickman 1991). The smallest home range estimates of 2.1ha for males and 1.4ha for females were recorded for a high density population (1.3–1.4 animals/ha) on Franklin Island, South Australia (Copley et al. 1990). The largest home range estimates of 5.3ha for males and 2.3ha for females and were calculated for a low density population (0.07–0.2 animals/ha) in Tasmania (Heinsohn 1966). A study of Quenda in the Perth metropolitan area found that animals' increased their home range size and grazed in more open habitats in areas when predator control was implemented, compared to areas where there was no predator control (Gardner 2004).

Quenda are omnivorous, feeding on invertebrates (including earthworms, beetles and larvae), underground fungi, subterranean plant material, and occasionally small vertebrates such as lizards (Broughton and Dickman 1991). Quenda build a nest consisting of a heap of ground litter over a shallow depression providing an internal chamber with loose regions at both ends for entry and exit. The dense vegetation probably protects the nest from extremes in temperature and wind, rain, and predators.

Heinsohn (1966) reported the sister species, the Southern Brown Bandicoot, reach sexual maturity at five to six months of age when they weigh approximately 600g. As males produce sperm throughout the year, it is the reproductive activity of the female that determines the beginning and length of the breeding season (Heinsohn 1966). Breeding peaks in spring (Thomas 1987, Mallick et al. 1998) and females have a gestation period of 12 to 13 days and litters of one to six young are produced, although litters of two to four are most common. Two or three litters may be reared during a single breeding season, although this is dependent upon the availability of food resources (Friend 1991, Mallick et al. 1998) and rainfall (Barnes and Gemmell 1984).

Appendix 6

Studies have reported the sex ratio of Southern Brown Bandicoots populations to be from 1.7 males to one female to 0.33 males to one female (Craven 1981, Thomas 1987, Mallick et al. 1998). The lifespan of the Quenda in the wild is estimated to be two to three years (Craven 1981).

Appendix 6

3. METHODOLOGY

One hundred baited wire cage traps were set in locations shown in Figure 1. Traps were located around the periphery of the Foreshore Reserve in a similar location to the spring 2022 monitoring survey. All cage traps were baited with a peanut butter sandwich and were set for 10 nights between 22 March to 6 April 2023.

In addition, five large wire cage traps were set to catch feral cats. These traps had an internal, spring-loaded door and were baited with a tin of sardines. These traps were placed in the southern and northern areas of native vegetation, in approximately the same locations as in the spring 2022 survey.

All traps were baited when they were opened, when they had no bait and on every other day if they had bait. All traps had a shade cover and were placed under vegetation. Traps were cleared from first light each morning.

Trapping was conducted under License FR28000058. Captured Quenda were measured, weighed, sexed and released near the point of capture. All Quenda that had not previously been caught had a microchip inserted on the dorsal surface near the shoulder blades. Recaptured Quenda were identified and released near their site of capture.

3.1 DATA ANALYSIS

Trap success rate was determined by dividing the trapping effort by the number of Quenda caught per trap-night. There were 100 cage traps targeting Quenda, so the trapping effort was therefore 1,000 trap-nights. There were an additional 45 cat trap-nights however, Quenda were caught only in the small cage traps. Trapping data are compared with previous survey data.

3.2 SIGNS

As recommended in the winter 2014 monitoring report (Terrestrial Ecosystems 2014a) signs (Plate 1) were prepared by Peet, and set up by Terrestrial Ecosystems on tracks leading into the survey area. These signs were designed to reduce the number of people and dogs interfering with traps and captured Quenda.



Plate 1. **Sign placed near the end of an access track**

Appendix 6

4. RESULTS AND DISCUSSION

4.1 SURVEY MONITORING

The Quenda trapping results are shown in Table 2. Nine individual Quenda were caught, with eight females and one male. None of the Quenda caught were under 300g (i.e. juveniles) and six weighted under 500g. Two weighing over 700g with the male being one of these. No young were observed in any pouch during this survey. The overall trapping success was 10.4% and 4.0% for the Quenda. The Quenda trapping success was lower than the spring 2022 survey (5.1%) and previous survey rates (10.7% autumn 2022, 11.3% spring 2021, 14.7% in autumn 2021 and 21.6% in spring 2020).

Table 2. Number of Quenda in Autumn 2023

	Number of individuals caught
Number of individuals captured	9
Number of adult males	1
Number of adult females	8
Number of male juveniles	0
Number of female juveniles	0

There were 104 separate capture events (i.e. individuals caught) with 40 of these events being Quenda. Individual Quenda were caught between 2 and 8 times. In addition to the 40 Quenda, 24 Black Rats (*Rattus rattus*) (Plate 2), 20 Bobtails (*Tiliqua rugosa*) (Plate 3), four House Mice (*Mus musculus*), two White-browed Scrubwren (*Sericornis frontalis*), 11 Grey-breasted White-eye (*Zosterops lateralis*) and 3 Cats (*Felis catus*) (Plate 4) were also caught.

Most captured Quenda appeared healthy, and mange was not observed on any Quenda during this survey. One adult female was found dead in a trap but there were no obvious signs of sickness or injury. Of the nine Quenda caught, five were caught for the first time during this monitoring program and did not have a microchip. The remaining four Quenda had been caught during previous monitoring surveys.

An abundance of rabbit activity (Plate 5) was observed in the area as well as rabbit warrens. Three cats were trapped inside the survey area and there were signs off predation on birds (Plate 6). People were observed walking their dogs around the perimeter of the site but there was little sign of dogs being walked within the reserve. Western Grey Kangaroos (Plate 7) were observed on several days during the survey, as well as their tracks and scats. This indicated that there continues to be a small population of kangaroos in the Foreshore Reserve. Even though there is partial habitat linkage to other areas of remnant native vegetation, it is unlikely that the Western Grey Kangaroos are moving north to the golf course or south to Madora Bay.

Appendix 6



Plate 2. Black Rat



Plate 3. Bobtail



Plate 4. Cat



Plate 5. Rabbit scats

Appendix



Plate 6. Predatory activity



Plate 7. Kangaroos

Appendix 6

4.2 STATUS OF THE POPULATION

The total number of Quenda caught during this monitoring program (9) is the same as spring 2022 (Table 1) but this is considerably lower than all previous surveys. The Foreshore Reserve population has now been supplemented on multiple occasions with Quenda from other areas, where vegetation clearing has removed their habitat. Additional Quenda were last relocated into the reserve in August 2021.

The population appears to be becoming very unbalanced. In the spring 2022 survey three males and six females were caught; in this survey one male and eight females were caught. The lack of any pouched young, may partially be attributable to the lack of males in the population. It is evident that only a few of the Quenda that are born each year are joining the adult population as five Quenda were caught for the first time in this survey and five of the female Quenda weighed less than 500g. Based on the fox tracks in the project area and three cats being caught, it is likely that these predators are having a negative impact on the Quenda population.

Peet is funding an ongoing fox and cat reduction program, and the City of Rockingham's contractors occasionally trap foxes in this reserve. However, it is likely that the reduction in vegetation in the reserve, the new roads, infrastructure and grassed areas, and the lack of adjoining native vegetation along the eastern boundary, have had a significant impact on the Quenda population. It is also clear that mature male Quenda are now reaching the end of their lifespan and this combined with limited recruitment and habitat loss has resulted in a further population decline.

4.3 WESTERN GREY KANGAROOS

Western Grey Kangaroos in the Foreshore Reserve and surrounds are very wary and largely remain out of sight, although there were kangaroo scats in the grassed playground area to the west of the reserve. These scats indicate that some kangaroos are foraging in this area at night when no one is around. Kangaroos were typically seen in the dense vegetation around the wetland area, although their tracks are occasionally seen on the sand

on the eastern side of the reserve. It was not possible to estimate the population size, however, the number of observations during this monitoring program suggests that it either has not increased or the increase is small.

4.4 RABBITS

Based on the rabbit scats and tracks, the population of rabbits in the Foreshore Reserve and the adjacent beach dunes is high and requires active management. No rabbits were caught in the reserve, although their diggings and scats were abundant around the periphery of the vegetated areas.

4.5 REPTILES

Twenty Bobtails were caught in this survey. No snakes were caught but one Dugite (*Pseudonaja affinis*) was observed along the edge of the vegetated reserve.

Appendix 6

5. CONCLUSION

The regrowth in the vegetation since the January 2016 fires has continued providing good habitat for the Quenda. The vegetation regrowth is having a two-fold positive effect on the population. As it has increased suitable habitat and offers protection from feral predators. The Foreshore Reserve is probably able to support a population of ~50 Quenda, so there is scope for a substantial population increase.

The results of this trapping program show the decline recorded in the 2022 spring survey has persisted. There is evidence of Quenda recruitment from adjacent areas or breeding with five new Quenda needing microchips in this survey. However, no juveniles or females with pouch young were captured. This is possibly due to mature male Quenda now reaching the end of their lifespan and a dwindling number males in the reserve. Because of predation by large snakes, foxes and cats, few of the Quenda born each year are joining the adult population. It is also likely that the fragmentation of the vegetation in the reserve, the new roads, infrastructure and grassed areas, and the lack of adjoining native vegetation along the eastern boundary, have had a significant impact on the Quenda population. A recent social media post indicated there was some community support for further fragmentation of the foreshore vegetation to construct a walking track from housing north of the project area to join the playground area.

As there are many fresh fox and cat prints found during this survey, the continuation of a management program for rabbits, cats, and foxes for the coastal dune system is essential to maintaining a viable population of Quenda in the Foreshore Reserve. It is evident that the fox and cat trapping program undertaken by the City of Rockingham was inadequate as there was an abundance of fox and cat tracks which almost certainly indicates multiple foxes in the Foreshore Reserve and domestic cats from the adjacent properties are regularly visiting the area.

A rabbit reduction program was implemented by Terrestrial Ecosystems during the monitoring program. Sliced up carrots were deployed at more than 50 sites around the reserve on two occasions before RHDV1-K5 was mixed into the sliced carrots and then deployed at established feeding sites. This virus release will substantially reduce the rabbit population in the reserve.

It is intended that Terrestrial Ecosystems will implement a fox trapping program in the reserve in May 2023, and this should reduce the abundance of foxes in the reserve. However, the foreshore vegetation is part of a linear corridor of native vegetation along the coast that stretches from Scientific Park at Point Kennedy, which has an abundance of foxes, to south of the Golden Bay foreshore reserve. The removal of foxes from the foreshore reserve will only provide temporary relief from fox predation on Quenda unless the City of Rockingham implements a sustained fox reduction program in Scientific Park and the rest of the foreshore reserve.

Appendix 6

6. RECOMMENDATIONS

It is recommended that:

(1) a feral cat trapping program is undertaken on a twice-yearly basis until the Quenda population increases, and this may be combined with the City of Rockingham's annual trapping program;
(2) a fox trapping program is undertaken on a twice-yearly basis until the Quenda population increases, and this may be combined with the City of Rockingham's annual trapping program; and
(3) a rabbit reduction program using RHDV1 K5 is repeated again in spring 2023.

Appendix 6

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Appendix 6

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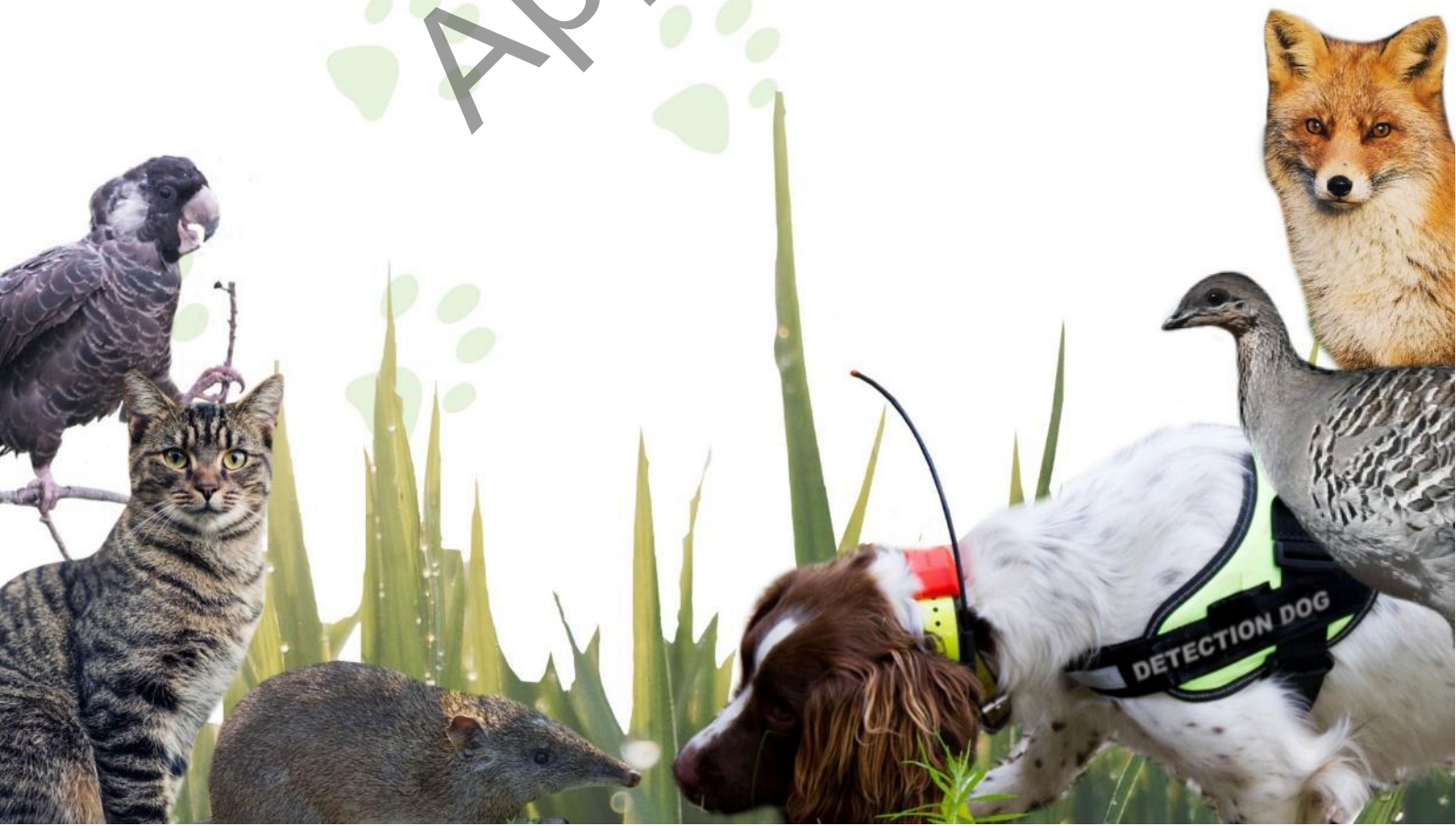
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Appendix 6

Figures

Quenda Monitoring Golden Bay
Autumn 2023

Appendix 6



PINPOINT CARTOGRAPHICS (08) 9562 7136 2023-0035-f01.dgn

N

0 20 40 60 80 100m

SCALE 1 : 3 000 at A3 (MGA)

LEGEND

- Foreshore Reserve Boundary
- Reserve Boundary
- Cadastral Boundary
- Trapping Site - Cat
- Trapping Site - Quenda

6 412 500mN

6 412 250mN

6 412 000mN

6 411 750mN

382 250mE

382 500mE

4779 R 47199

9036

505 R 54030

503

501 R 27066

502 R 27066

504 R 27066

2031 R 27066

2486 R 34664

8009 R 52131

2533 R 35364

Cat 1

Cat 2

Cat 3

Cat 4

Cat 5

AUREA BOULEVARD

WOODLANDS ROAD

IVANHOE STREET

MARILLANA DRIVE

TANGADEE ROAD

CADASTRAL SOURCE: Landgate, May 2023.
AERIAL PHOTOGRPAH SOURCE: NearMap, flown February 2023.

TERRESTRIAL ECOSYSTEMS

Drawn: G. Thompson

Date: 14 May 2023

Peet Ltd and Department of Housing
QUENDA MONITORING
GOLDEN BAY - AUTUMN 2023

TRAPPING SITES

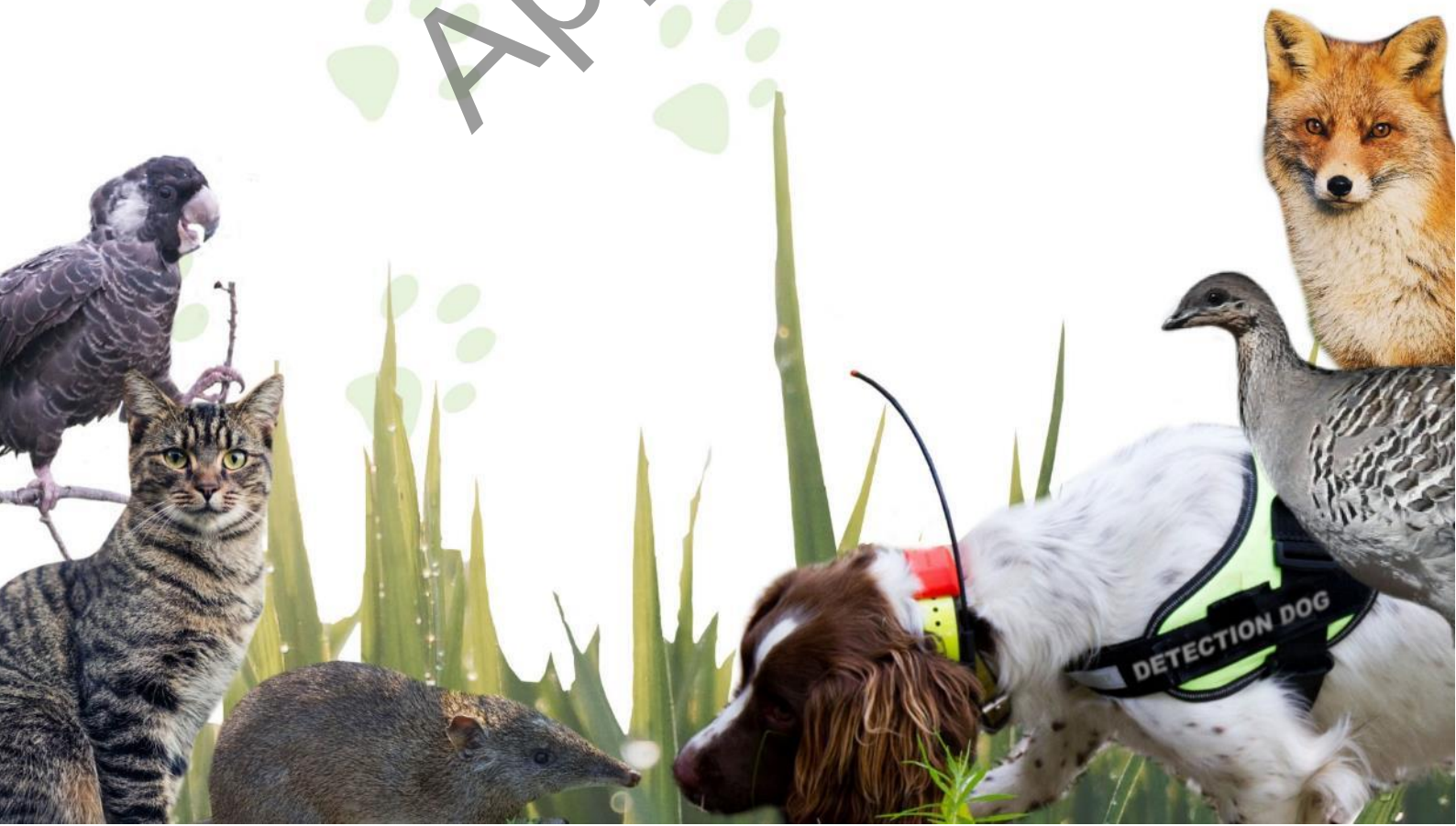
Figure 1

Job: 2023-0035

Appendix A.
Quenda trapping results

Quenda Monitoring Golden Bay
Autumn 2023

Appendix 6



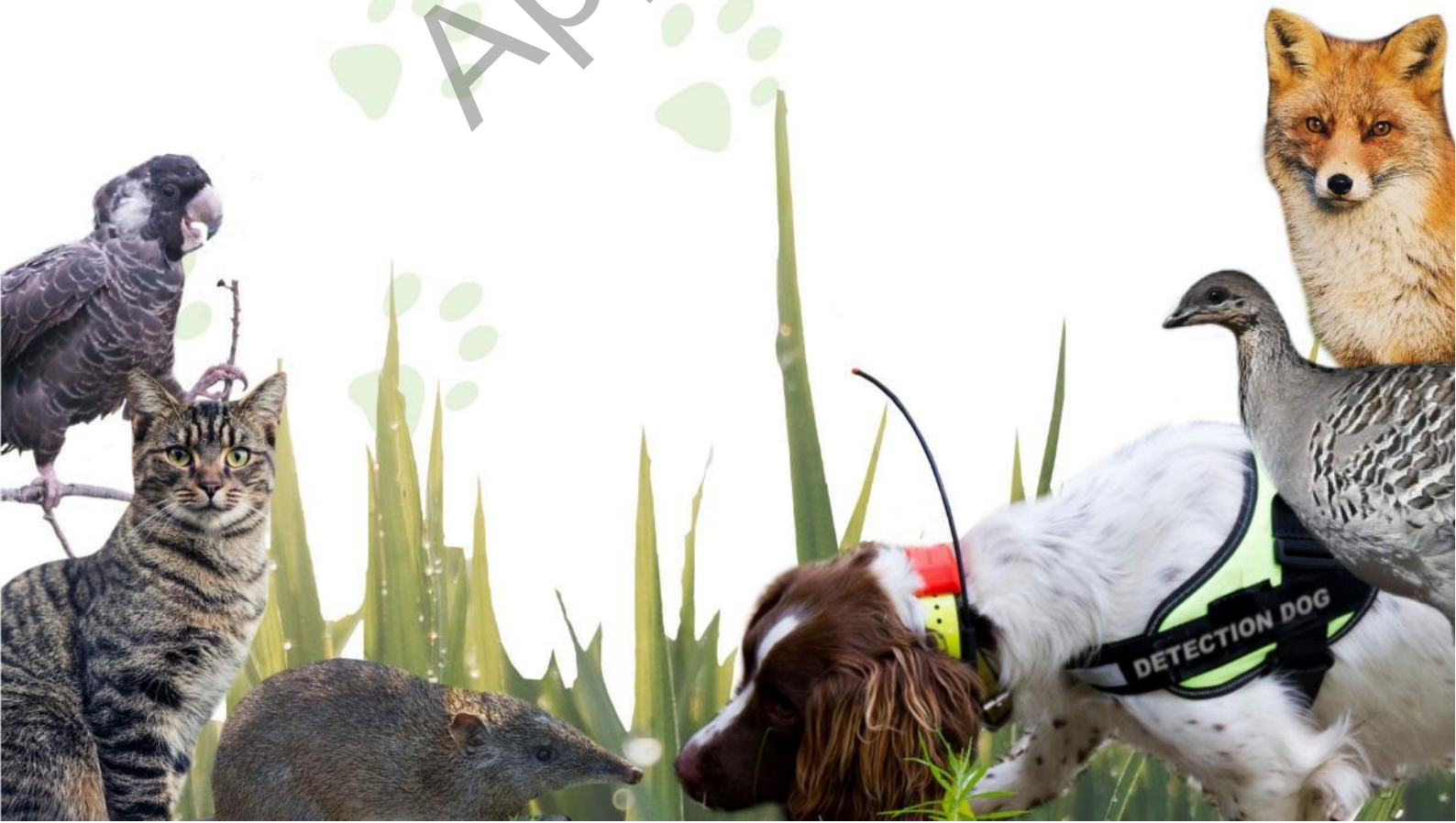
A.1 QUENDA TRAPPING RESULTS

Sex	Mass (g)	HL (mm)	HW (mm)	Pes (mm)	Chip No	28/03/23	29/03/23	30/03/23	31/03/23	1/04/23	2/04/23	3/04/23	4/04/23	5/04/23	6/04/23	Total
Female	440	77	30.5	54	79D5ADD	X		X			X	X	X	X		6
Female	710	57	38.5	55.8	7ACA518		X	X	X	X		X	X	X		7
Female	650	64	30.8	53.5	7E795B0		X	X	X	X		X		X		6
Male	720	79.5	38.8	59.6	7E7362C		X	X		X	X	X		X		6
Female	480	69.2	29.7	52.6	7E755C3		X				X	X				3
Female	410	56.3	32.3	47.3	7E75996			X			X					2
Female	360	66.5	26.4	18.5	7E750D1						X	X		X		3
Female	400	68	26.5	49.5	7E7280F							X			X	2
Female	420	60.5	30.1	49.9	7E74C02								X	X		2

Note*
-7E755C3 was captured on the 27/03/23 as traps were being set. This capture is not included in the table.
-Some Quenda were captured twice a day in different traps.

Appendix 6

Appendix 6



Quenda Monitoring Golden Bay

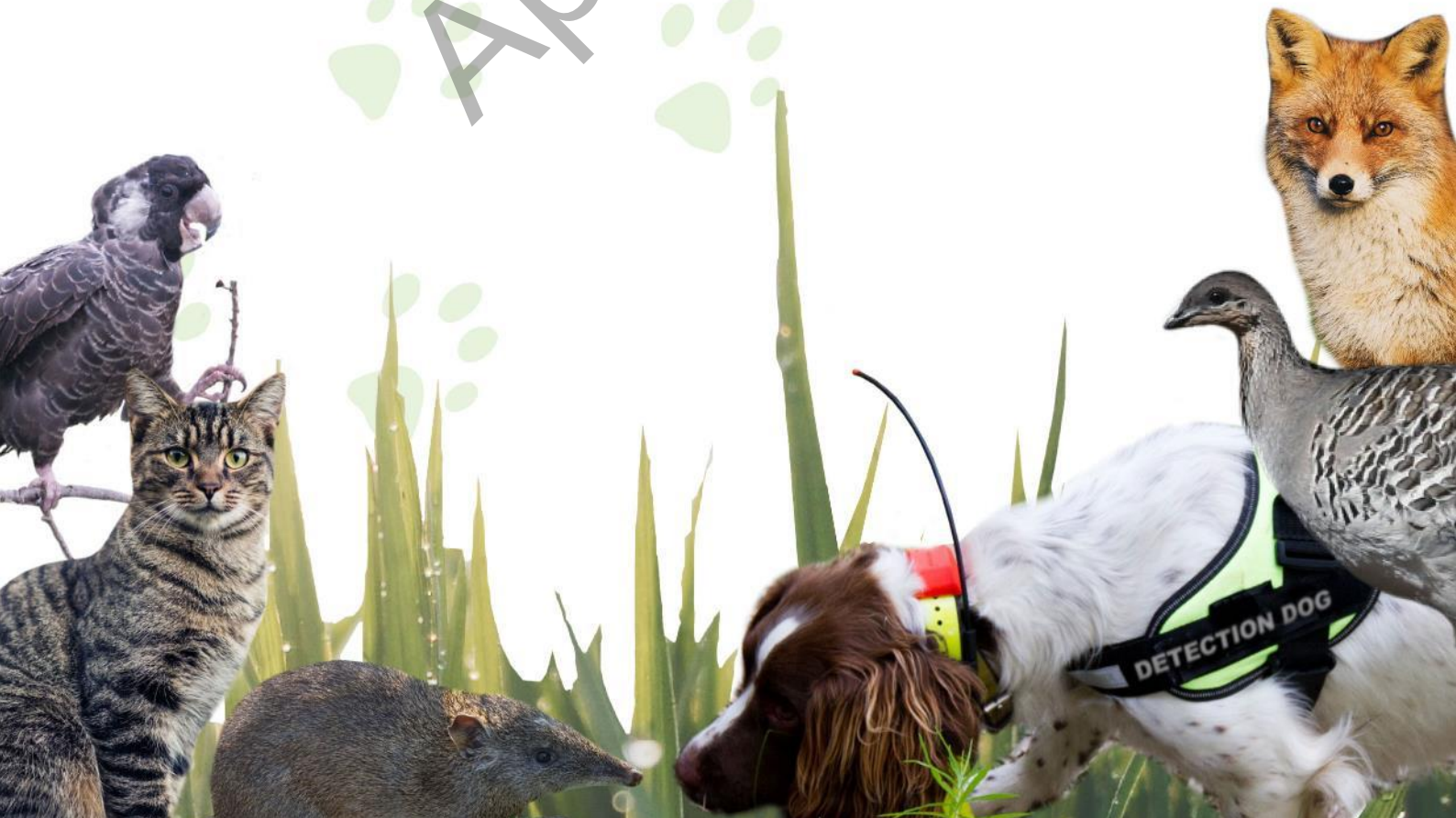
Spring 2023

Prepared for: Peet Ltd

Version 1. November, 2024



Appendix 6



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Appendix 6

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REPORT CONTENTS

EXECUTIVE SUMMARY

1. INTRODUCTION 1

1.1 Background 1
1.2 Scope of this Quenda survey for long-term monitoring 1

2. BIOLOGY AND ECOLOGY OF QUENDA 3

3. METHODOLOGY 5

3.1 Data analysis 5
3.2 Signs 5

4. RESULTS AND DISCUSSION 6

4.1 Survey monitoring 6
4.2 Status of the population 8
4.3 Western Grey Kangaroos 8
4.4 Rabbits 8
4.5 Reptiles 8

5. CONCLUSION 9

6. RECOMMENDATIONS 10

7. REFERENCES 11

Appendix 6

LIST OF PLATES

Plate 1. Sign placed near the end of an access track 5
Plate 2. Quenda 7
Plate 3. Rabbit 7
Plate 4. White-browed Scrubwren 7
Plate 5. Bobtail 7
Plate 6. Quenda with pouched young 7
Plate 7. Western Bearded Dragon 7

LIST OF FIGURES

Figure 1. Trapping sites

LIST OF APPENDICES

Appendix A. Quenda trapping results

EXECUTIVE SUMMARY

Peet Ltd, on behalf of Peet Ltd and the Department of Housing, requested a follow up monitoring survey of the Quenda (*Isoodon fusciventer*) population in the Foreshore Reserve adjacent to Lot 2, Warnbro Sound Ave, Golden Bay (i.e. 'project area'). This follows on from an initial survey in spring 2012 and subsequent monitoring surveys in autumn and spring of 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021 and 2022 and autumn of 2023. Quenda (formerly part of the Southern Brown Bandicoot complex) monitoring is a requirement under the Ministerial Statement 150 and compliance reports are provided to the Office of the Environmental Protection Authority on an annual basis.

The Foreshore Reserve includes the foredune and swale, and the hinterland vegetation inland for about 400m from the ocean. The Foreshore Reserve includes a Conservation Category Wetland and a Threatened Ecological Community (TEC) that supported dense vegetation before it was burnt.

The project area was extensively burnt in January 2016 and the only unburnt habitat that remained was in the southern end of the Foreshore Reserve. Since the burn in January 2016, there has been significant regrowth of vegetation across the entire burnt area.

In June 2019, vegetation was cleared for the construction of a sealed road and grassed area in the foreshore dune area. The new sealed road enters from the southern end of the Foreshore Reserve, and there is now a large, cleared area between the wetland vegetation and foredunes. This area contains a playground and a formed track for bicycle riding, carparks at either end and two access tracks to the beach. In July 2020, vegetation was cleared for the construction of a drain on the southern boundary adjacent to Solstice Grove. Construction of this area continued in August 2021 to build a sealed road that connects the playground carpark to the northern end of Marillana Drive, and to extend the subdivision. As part of these construction programs, some areas that had previously been trapped for Quenda were cleared of vegetation.

Quenda abundance has declined in 2022-2023 compared with all previous surveys. The population at Golden Bay often fluctuates in response to a combination of factors, including predator control and resource availability, however, construction activity, loss of habitat, reduced overall native vegetation, particularly east of the reserve and increasing access of feral predators into the bushland through fragmentation will inevitably result in a reduced population.

There is historical evidence of breeding and the maintenance of a reasonable population of Quenda in the reserve, however, as discussed in previous reports, very few juveniles are entering the adult population, suggesting that predation on the smaller sized Quenda is a major problem.

It is recommended that:

a) a fox trapping program is undertaken annually; and
b) a rabbit reduction program using RHDV1 K5 is repeated again in autumn 2024.

Appendix 6

1. INTRODUCTION

1.1 BACKGROUND

Peet Ltd, on behalf of Peet Ltd and the Department of Housing, requested a follow up monitoring survey of the Quenda (*Isoodon fusciventer*) population in the Foreshore Reserve adjacent to Lot 2, Warnbro Sound Ave, Golden Bay (i.e. 'project area'). This follows on from an initial survey in spring 2012 and subsequent monitoring surveys in autumn and spring of 2013, 2014, 2015, 2016, 2017, 2018, 2019, 2020, 2021, 2022 and an autumn survey earlier this year (Terrestrial Ecosystems 2012, 2013b, a, 2014a, b, 2015a, b, 2016a, b, 2017b, a, 2018a, b, 2019a, b, 2020a, b, 2021a, b, 2022a, b, 2023). Along with a survey performed in autumn of this year Quenda (formerly part of the Southern Brown Bandicoot complex) monitoring is a requirement under the Ministerial Statement 150 and compliance reports are provided to the Office of the Environmental Protection Authority on an annual basis.

The Foreshore Reserve includes the foredune and swale, and the hinterland vegetation inland for about 400m from the ocean. The Foreshore Reserve includes a Conservation Category Wetland and a Threatened Ecological Community (TEC) that supported dense vegetation before it was burnt.

The project area was extensively burnt in January 2016 and the only continuous unburnt habitat that remained was in the southern end of the Foreshore Reserve. Since the burn in January 2016, there has been significant regrowth of vegetation across the entire burnt area.

In June 2019, vegetation was cleared for the construction of a sealed road and grassed area in the Foreshore dune area. The new sealed road enters from the southern end of the Foreshore Reserve, and there is now a large, cleared area between the wetland vegetation and foredunes. This area contains a playground and a formed track for bicycle riding, car parks at either end, and two access tracks to the beach. In July 2020, vegetation was cleared for the construction of a drain on the southern boundary adjacent to Solstice Grove. Construction of this area continued in August 2021, to build a sealed road that connects the playground carpark to the northern end of Marillana Drive, and to extend the subdivision. As part of these construction programs, some areas that we had previously trapped for Quenda were cleared of vegetation.

Due to the construction works, flooding in the wetland and the regrowth in vegetation across the whole of the Foreshore Reserve, the location of traps was changed for the spring 2022 survey and again for this survey, although we used the same number of traps and similar trap locations.

Appendix 6

1.2 SCOPE OF THIS QUENDA SURVEY FOR LONG-TERM MONITORING

The Foreshore Reserve will remain public open space and the developer has made a commitment to monitor the health of the Quenda population on a twice yearly basis during the construction and development stages (PGV Environmental 2011).

Coffey Environments recorded eight Quenda in the reserve during its survey in mid-February 2010 (PGV Environmental 2011). It was reported that Quenda preferred scrubby, often swampy vegetation with a dense understorey of cover up to one metre high. The Threatened Ecological Community and wetland areas within the Foreshore Reserve were considered suitable habitat to sustain a bandicoot population in the long-term (PGV Environmental 2011).

Multiple Quenda relocation programs have been undertaken for each stage of development prior to vegetation clearing from Lot 2, Warnbro Sound Ave and Lot 3, Dampier Drive as required under Ministerial Statement 150. These programs were implemented to minimise the impact of vegetation clearing on Quenda residing in these lots. All Quenda caught prior to the vegetation clearing program in July 2016 were relocated out of the

monitoring area as there would have been insufficient habitat remaining to sustain this population given the area that had been burnt in January 2016.

The results of twenty-two previous monitoring surveys are shown in Table 1. This report provides the outcomes of the twenty-third monitoring survey of Quenda in the Foreshore Reserve.

Table 1. Number of Quenda in previous monitoring programs

	Spring 2012	Winter 2013	Spring 2013	Winter 2014	Spring 2014	Autumn 2015	Spring 2015	Autumn 2016	Spring 2016	Autumn 2017	Spring 2017	Autumn 2018	Spring 2018	Autumn 2019	Spring 2019	Autumn 2020	Spring 2020	Autumn 2021	Spring 2021	Autumn 2022	Spring 2022	Autumn 2023
# of indiv. captured	31	30	28	39	48	53	36	26	12	15	15	12	46	44	29	31	40	28	26	19	9	9
# of adult males	13	10	7	11	10	16	14	8	4	9	10	8	26	20	15	12	16	15	12	5	2	1
# of adult females	15	20	21	27	25	34	17	17	4	5	5	4	17	24	13	17	18	13	11	12	5	8
# of juvenile males	1			1						1						1	2				1	
# of juvenile females	2					3	5		4				1			1	3		3	2	1	
# juvenile of unknown sex					12																	
Unknown sex and age					1								2									
Unknown age								1F							1F		1F					

* Notes -
Spring 2014 - there are 12 juveniles (less than 300g) and there was no information available on body weights
Autumn 2015 - 2 dead individuals included in table
Autumn 2016 – 2 females with no weight and 1 of them was an adult based on other measurements; the other one has no measurements recorded
Spring 2018 - 2 adults with no data, one escaped.
Spring 2019 - one male died (included in table) and 1 female with no measurements recorded
Spring 2020 – includes 4 individuals where the chip reader failed.

Appendix 6

The January 2016 fire was followed by a reduction in the population of Quenda in the reserve. The autumn 2018 survey report (Terrestrial Ecosystems 2018a) indicated that the vegetation in the burnt area had regenerated and much of the burnt section of the Foreshore Reserve could now support Quenda. To supplement the low Quenda population in the reserve, Quenda were relocated into the foreshore reserve from vegetation clearing projects at sites in east Rockingham, Florida and Madora Bay. All relocated Quenda had a microchip and were measured in a similar manner to those at Golden Bay. Additional Quenda have been translocated to the reserve in 2022 and 2023 from areas where ethe vegetation was to be removed. It was noted that the Quenda population showed a marked decline in the spring 2022 survey.

2. BIOLOGY AND ECOLOGY OF QUENDA

The Quenda (*I. fusciventer*) is a medium-sized, ground-dwelling marsupial that belongs to the Peramelidae family (Van Dyck and Strahan 2008, Travouillon and Phillips 2018). Populations of Quenda occur widely throughout southern Western Australia (Rees and Paull 2000, Van Dyck and Strahan 2008). In 2018, the Western Australian Southern Brown Bandicoot was elevated to a full species and is now commonly called a Quenda in WA (Travouillon and Phillips 2018).

Isoodon fusciventer was listed as a Schedule 1 species (Fauna that is rare or likely to become extinct) under the Western Australian *Wildlife Conservation Act 1950* until 1998. An increase in the population, which was attributed to the implementation of fox baiting throughout the state, meant that in 1998 Quenda was removed from the threatened species list. Quenda is now listed as a Priority 4 species ('Taxa in need of monitoring') on the Department of Biodiversity, Conservation and Attractions' (DBCAs) Priority Fauna List.

Quenda are found in the wetter sections of the south-west of Western Australia, mostly along the Swan Coastal Plain from the Moore River to Walpole and the Fitzgerald River area. Populations of Quenda are found in a variety of habitats in this region and appear to be able to survive a level of habitat destruction and live close to urban and industrial developments. Quenda prefer habitats with a dense shrub understorey up to one metre high, but they are found in a variety of habitats including Banksia, Eucalypt and Melaleuca woodlands, but often in close proximity to a wetland where the vegetation is often more dense (Stoddard and Braithwaite 1979, Ramalho et al. 2013). In areas of thick undergrowth, Quenda are able to establish runways that are difficult to detect beneath the interlocking overlying vegetation (Craven 1981). They are vulnerable to cat, fox and dog predation and are occasionally seen dead on the roads in urban environments, with the result that they are increasingly under threat due to the clearing of bushland leading to habitat fragmentation, bushland degradation and predation by introduced predators including foxes, cats and dogs (Friend 1991).

Quenda and its sister species, the Southern Brown Bandicoot which is found in the eastern states, are both nocturnal and diurnal, but are mostly active during the day early in the morning or late afternoon (Van Dyck and Strahan 2008). Individuals are mostly solitary, but with overlapping home ranges. The home range size of Quenda decreases with increasing population size (Broughton and Dickman 1991). The smallest home range estimates of 2.1ha for males and 1.4ha for females were recorded for a high density population (1.3–1.4 animals/ha) on Franklin Island, South Australia (Copley et al. 1990). The largest home range estimates of 5.3ha for males and 2.3ha for females and were calculated for a low density population (0.07–0.2 animals/ha) in Tasmania (Heinsohn 1966). A study of Quenda in the Perth metropolitan area found that animals' increased their home range size and grazed in more open habitats in areas when predator control was implemented, compared to areas where there was no predator control (Gardner 2004).

Quenda are omnivorous, feeding on invertebrates (including earthworms, beetles and larvae), underground fungi, subterranean plant material, and occasionally small vertebrates such as lizards (Broughton and Dickman 1991). Quenda build a nest consisting of a heap of ground litter over a shallow depression providing an internal chamber with loose regions at both ends for entry and exit. The dense vegetation probably protects the nest from extremes in temperature and wind, rain, and predators.

Heinsohn (1966) reported the sister species, the Southern Brown Bandicoot, reach sexual maturity at five to six months of age when they weigh approximately 600g. As males produce sperm throughout the year, it is the reproductive activity of the female that determines the beginning and length of the breeding season (Heinsohn 1966). Breeding peaks in spring (Thomas 1987, Mallick et al. 1998) and females have a gestation period of 12 to 13 days and litters of one to six young are produced, although litters of two to four are most common. Two or three litters may be reared during a single breeding season, although this is dependent upon the availability of food resources (Friend 1991, Mallick et al. 1998) and rainfall (Barnes and Gemmell 1984).

Appendix 6

Studies have reported the sex ratio of Southern Brown Bandicoots populations to be from 1.7 males to one female to 0.33 males to one female (Craven 1981, Thomas 1987, Mallick et al. 1998). The lifespan of the Quenda in the wild is estimated to be two to three years (Craven 1981).

Appendix 6

3. METHODOLOGY

One hundred baited wire cage traps were set in locations shown in Figure 1. Traps were located around the periphery of the Foreshore Reserve in a similar location to the Spring 2022 and Autumn 2023 monitoring surveys. All cage traps were baited with a peanut butter sandwich and were set for 10 nights between 8-18 October 2023.

All traps were baited when they were opened, when they had no bait and on every other day if they had bait. All traps had a shade cover and were placed under vegetation. Traps were cleared from first light each morning.

Trapping was conducted under License FR28000058. Captured Quenda were measured, weighed, sexed and released near the point of capture. All Quenda that had not previously been caught had a microchip inserted on the dorsal surface near the shoulder blades. Recaptured Quenda were identified and released near their site of capture.

3.1 DATA ANALYSIS

Trap success rate was determined by dividing the number of Quenda caught by the trapping effort. There were 100 cage traps targeting Quenda, so the trapping effort was therefore 1,000 trap-nights. Trapping data are compared with previous survey data.

3.2 SIGNS

As recommended in the winter 2014 monitoring report (Terrestrial Ecosystems 2014a) signs (Plate 1) were prepared by Peet, and set up by Terrestrial Ecosystems on tracks leading into the survey area. These signs were designed to reduce the number of people and dogs interfering with traps and captured Quenda.



Plate 1. Sign placed near the end of an access track

Appendix 6

4. RESULTS AND DISCUSSION

4.1 SURVEY MONITORING

The Quenda trapping results are shown in Table 2. Seventeen individual Quenda were caught, with 12 being female, four being male and one individual who escaped before being sexed. Two Quendas caught were under 300g (i.e. juveniles), none were between 300-500 and 14 were over 700g. Of the 12 females caught eight had pouched young. Each female bearing young had between two and three young with sizes varying from less than 10mm to 70mm (Plate 6) for a total of 18 young. The overall trapping success was 21.7% while Quenda trapping success was 7.7% .The Quenda trapping success was higher than the previous two surveys (4% autumn 2023, 5.1% spring 2022) but it still isn't as high as the start of 2021 where the success rate and population had started to decline (10.7% Autumn 2022, 11.3% Spring 2021, 14.7% autumn 2021).

Table 2. Number of Quenda in Spring 2023

	Number of individuals caught
Number of individuals captured	17
Number of adult males	4
Number of adult females	10
Number of male juveniles	0
Number of female juveniles	2
Number of individuals with unknown sex and age	1

There were 217 separate capture events (i.e. individuals caught) with 72 of these events being Quenda. Individual Quenda were caught between one and nine times. In addition to the 72 Quenda captures (Plate 2), five Black Rats (*Rattus rattus*), 51 individual Bobtails (*Tiliqua rugosa;* Plate 5), one Western Beard Dragon (*Pogona minor)* (Plate 7), four House Mice (*Mus musculus*), two White-browed Scrubwren (*Sericornis frontalis*; Plate 4), 11 Silvereye (*Zosterops lateralis*) were caught.

Most captured Quenda appeared healthy, and mange was not observed on any Quenda during this survey. Of the 17 individual Quenda caught, seven were caught for the first time during this monitoring program and did not have a microchip. Nine Quenda had been caught during previous monitoring surveys and one individual got away before it was able to be sexed or aged.

Rabbits were observed in the area while checking traps and were also caught during the trapping sessions. People were observed walking their dogs around the perimeter of the site but there was little sign of dogs being walked within the reserve. Western Grey Kangaroos were observed while setting out traps and during the trapping program, indicating that a small population of kangaroos continues to exist in the Foreshore Reserve. Even though there is partial habitat linkage to other areas of remnant native vegetation, it is unlikely that the Western Grey Kangaroos are moving north to the golf course or south to Madora Bay.

Appendix C



Plate 2. Quenda



Plate 3. Rabbit



Plate 4. White-browed Scrubwren



Plate 5. Bobtail



Plate 6. Quenda with pouched young



Plate 7. Western Bearded Dragon

Appendix

4.2 STATUS OF THE POPULATION

The total number of Quenda caught during this monitoring program (17) is most like that of spring 2022 (Table 1) and is higher than the past two surveys (Table 1). The Foreshore Reserve population has now been supplemented on multiple occasions with Quenda from other areas, where vegetation clearing has removed their habitat. Additional Quenda were last relocated into the reserve in June 2023.

The population appears to be on the increase and is becoming more balanced. In the Autumn 2023 survey one male and eight females were caught but in this survey four males and 12 females were caught. There has also been an increase in young since the last survey. There is some evidence that the population is on the rise, and this is possibly due to a decrease in feral predators in the area. While no fox tracks were present there was still the evidence (i.e. tracks) of cats.

Peet has funded an ongoing fox and cat reduction program, and the City of Rockingham's contractors occasionally trap foxes near this reserve. This small increase in Quenda numbers has occurred when there has been a reduction in vegetation, the new roads, infrastructure and grassed areas, a reduced connection to adjoining native vegetation and possibly an increase in domestic animal presence (more dog walkers and more domestic cats).

4.3 WESTERN GREY KANGAROOS

Western Grey Kangaroos in the Foreshore Reserve and surrounds are very wary and largely remain out of sight. Kangaroos were seen once in the dense vegetation around the wetland area, although their tracks were occasionally seen on the sand on the eastern side of the reserve. It was not possible to estimate the population size, however, the number of observations during this monitoring program suggests that it either has not increased or the population is decreasing.

4.4 RABBITS

Based on the rabbit scats and tracks, the population of rabbits in the Foreshore Reserve and the adjacent beach dunes is lower than last year but still requires active management. Two rabbits were caught in the trapping program, while their diggings were abundant around the periphery of the vegetated areas. They were also observed several times on the western side of the site. There were fewer observed fresh large scat piles which could indicate a decrease in population, but this is contradicted by the increased number of sightings and captures compared with the last survey.

4.5 REPTILES

Fifty-one individual Bobtails were caught in this survey. Individuals were determined by the presence of ticks. Once a bobtail was caught, they had all their ticks removed so recaptures would have little or no ticks. One Western Blue Tongue was caught and two bearded dragons were observed during the survey. No snakes were caught but three Dugites (*Pseudonaja affinis*) were observed along the edge of the vegetated reserve while one was seen further inland on the eastern side of the reserve.

Appendix 6

5. CONCLUSION

The regrowth in the vegetation since the January 2016 fires has matured providing good habitat for the Quenda. The vegetation regrowth is having a two-fold positive effect on the population. As it has increased suitable habitat whilst also offering protection from feral predators. The Foreshore Reserve is probably able to support a population of ~50 Quenda, so there is scope for a further population increase.

The results of this trapping program show the decline recorded in the 2022 spring survey may have turned around. There is evidence of Quenda recruitment or breeding with seven new Quenda being microchiped in this survey. An increase in breeding activity is evident with eight females being caught with pouch young. Because of predation by large snakes, cats and possibly foxes the chances of the young and juveniles surviving to full maturity is still poor. It is also likely that the fragmentation of the vegetation in the reserve, the new roads, infrastructure and grassed areas, and the lack of adjoining native vegetation along the eastern boundary, have had a significant impact on the Quenda population. A possible increase in domestic animal activity due to finished road construction could also be having an impact on the Quenda population. There were a large number of dogs being walked during this survey and a domesticated cat was observed in the survey area.

While there wasn't any direct evidence of foxes, they are still present in the surrounding areas and pose a risk to the Quenda population. However, there was still a high presence of rabbits so a continuation of a management program for rabbits, cats and foxes is essential to maintaining a viable population of Quenda in the Foreshore Reserve.

It appears previous rabbit reduction programs have shown some success as there were less fresh scats than recorded in the previous survey.

Appendix 6

6. RECOMMENDATIONS

It is recommended that:

a. a fox trapping program is undertaken annually; and
b. a rabbit reduction program using RHDV1 K5 is repeated again in autumn 2024.

Appendix 6

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Terrestrial Ecosystems. 2019b. Quenda Monitoring Golden Bay - Spring 2019. Perth.

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Terrestrial Ecosystems. 2020b. Quenda Monitoring Golden Bay - Spring 2020. Perth.

Appendix 6

Terrestrial Ecosystems. 2021a. Quenda Monitoring Golden Bay - Autumn 2021. Perth.

Terrestrial Ecosystems. 2021b. Quenda Monitoring Golden Bay - Spring 2021. Perth.

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Appendix 6

Figures

Quenda Monitoring Golden Bay
Spring 2023

Appendix 6



PINPOINT CARTOGRAPHICS (08) 9562 7136 2023-0035-spring 2023-f01.dgn



CADASTRAL SOURCE: Landgate, May 2023.
AERIAL PHOTOGRPAH SOURCE: NearMap, flown October 2023.

TERRESTRIAL ECOSYSTEMS

Drawn: G. Thompson | Date: 20 Nov 2023

Peet Ltd and Department of Housing
QUENDA MONITORING
GOLDEN BAY - SPRING 2023

TRAPPING SITES

Figure 1

Job: 2023-0035

Appendix A.
Quenda trapping results

Quenda Monitoring Golden Bay
Spring 2023

Appendix 6

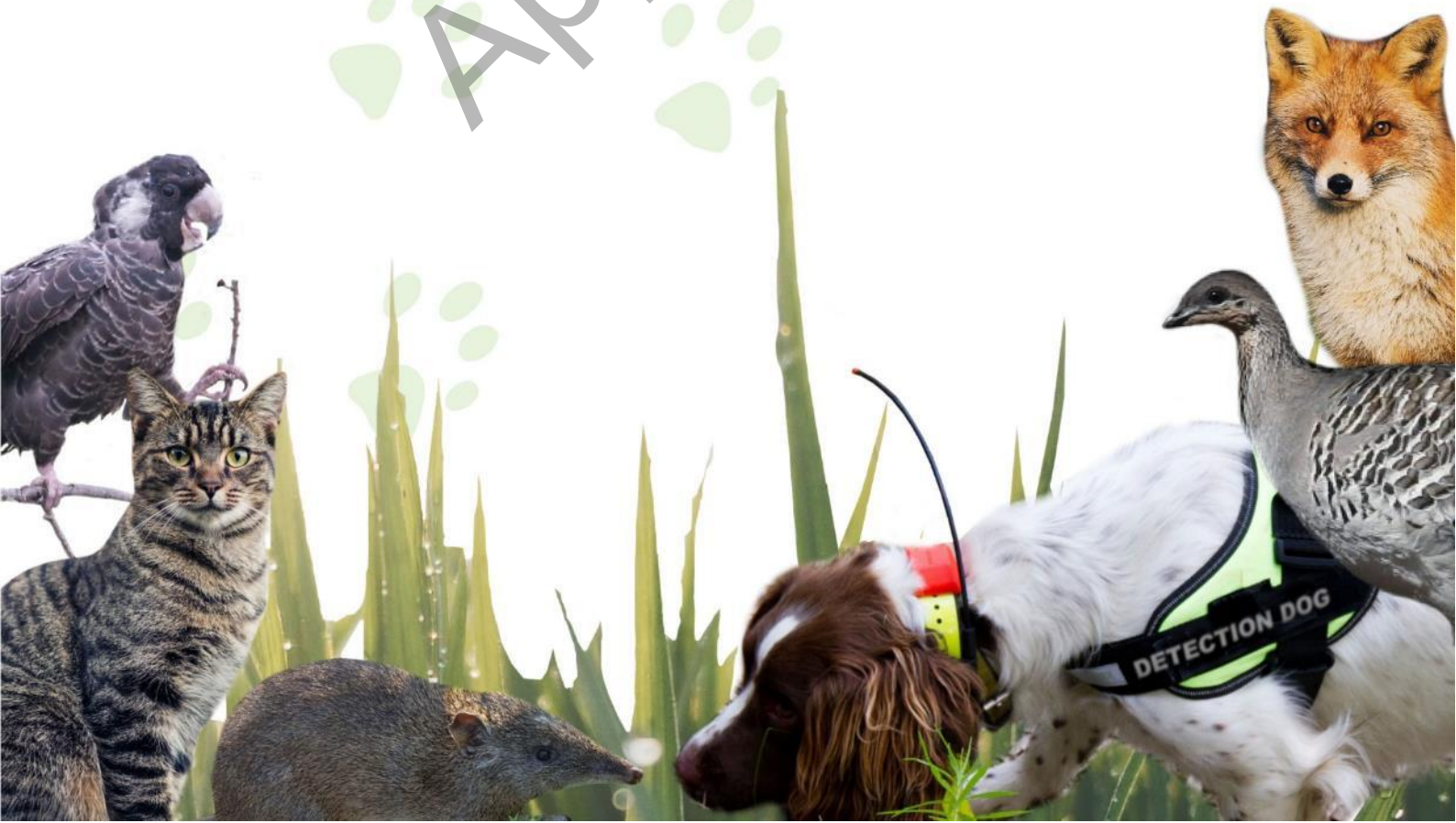


Sex	Mass (g)	HL (mm)	HW (mm)	Pes (mm)	Young	Chip No	9/10/23	10/10/23	11/10/23	12/10/23	13/10/23	14/10/23	15/10/23	16/10/23	17/10/23	18/10/23	Total
Female	0.59	73	31	31	No young	0007E7528A/0007E7280F		x		x		x	x		x		5
Female	0.56	66	40	46	No young	0007E74CO2	x	x			x	x	x			x	6
Male	0.64	83	40	40	N/A	0007E732D7				x	x		x	x	x	x	6
Male	0.88	79	33	48	N/A	0007AC7043	x		x		x	x	x		x	x	7
Male	1.32	91	36	64	N/A	0007E72875		x		x		x	x	x	x	x	7
Female	0.82	76	39	50	2 15mm young (furless)	0007E72915	x		x	x		x	x	x	x	x	8
Female	0.68	74	31	54	2 x 15mm young (furless), 1 dropped in cage (deceased)	0007E7970C	x						x		x		3
Female	0.62	80	34	50	2x 20mm young (furless), 1x 50mm young (furless)	0007E7AA1C	x	x				x			X		4
Female	0.23	57	29	44	No young	0007E74BB8				x							1
Female	0.22	56	31	42	No young	0007E739B3								x		x	2
Male	1.32	84	40	51	N/A	0007E7362C	x	x	x	x	x	x	x	x	x		9
Female	0.91	78	47	53	2x 60mm young (furless)	0007E73F52		x				x				x	3
Female	0.54	78	37	51	2x <10mm young (furless)	0007E75996			x	x					x		3
Female	0.8	73	39	52	2x 40mm young (furless)	0007E795B0			x	x					x		3
Female	74	34	49	0.63	3x 60-70mm young (furless)	0007E750D1				x	x		x	x			4
Female	75	44	51	0.9	2x 50mm young (furless)	0007ACA518			x								1

Note*
-1 individual escaped during survey and was unable to be sexed or aged (not included)
-Some individuals were caught twice in same day (not included)

Appendix 6

Appendix 6



Ref: 2023-0041-002-gt V2

26 May 2023

Kasia Majewski
Development Manager
Peet Ltd
Level 7, 200 St Georges Terrace
Perth WA 6000

Re: Results of the fox and rabbit control – Golden Bay Foreshore Reserve

Dear Kasia

This letter reports on the results of the fox and rabbit control program in the Foreshore Reserve at Golden Bay.

Rabbit management

Terrestrial Ecosystems staff dispersed sliced carrots at multiple locations around the Foreshore Reserve on 28 and 30 March 2023 and then on 3 April deployed rabbit haemorrhagic disease virus (i.e. RHDV1 - K5 is a variant of rabbit haemorrhagic disease virus) in sliced carrots at these same locations.

There was a noticeable decline in the number of rabbits in the foreshore reserve.

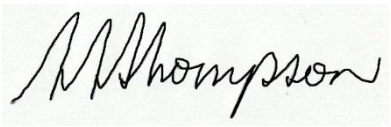
Fox trapping

Fox trapping was undertaken using rubber lined foot hold traps with each site having an olfactory lure. Traps were set on 11 May and retrieved 17 May 2023. Signs were placed around the foreshore reserve before trapping was undertaken and retrieved when the trapping program was completed. We completed an additional nights trapping because there was evidence of a fox in the area when the trapping program was meant to stop on 16 May 2023.

Three cats (Plate 2) were caught in the foot-hold traps and given to the City of Rockingham rangers and one female fox (4.04kg; Plate 1) was trapped and euthanased. Two of the three cats had been caught previously during the April 2023 Quenda monitoring program.

Please do not hesitate in contacting myself (0407 385 239) or Dr Graham Thompson (0438 491 227), if you require any further information regarding this proposal.

Yours faithfully



Dr Scott Thompson
Partner and Principal Zoologist

Appendix 6



Plate 1. Caught fox



Plate 2. Two cats caught on the same night

Appendix 6

Disclaimer

This document is prepared in accordance with and subject to an agreement between Terrestrial Ecosystems and the client, Peet Ltd. It has been prepared and is restricted to those issues that have been raised by the client in its engagement of Terrestrial Ecosystems and prepared using the standard of skill and care ordinarily exercised by environmental scientists in the preparation of such reports.

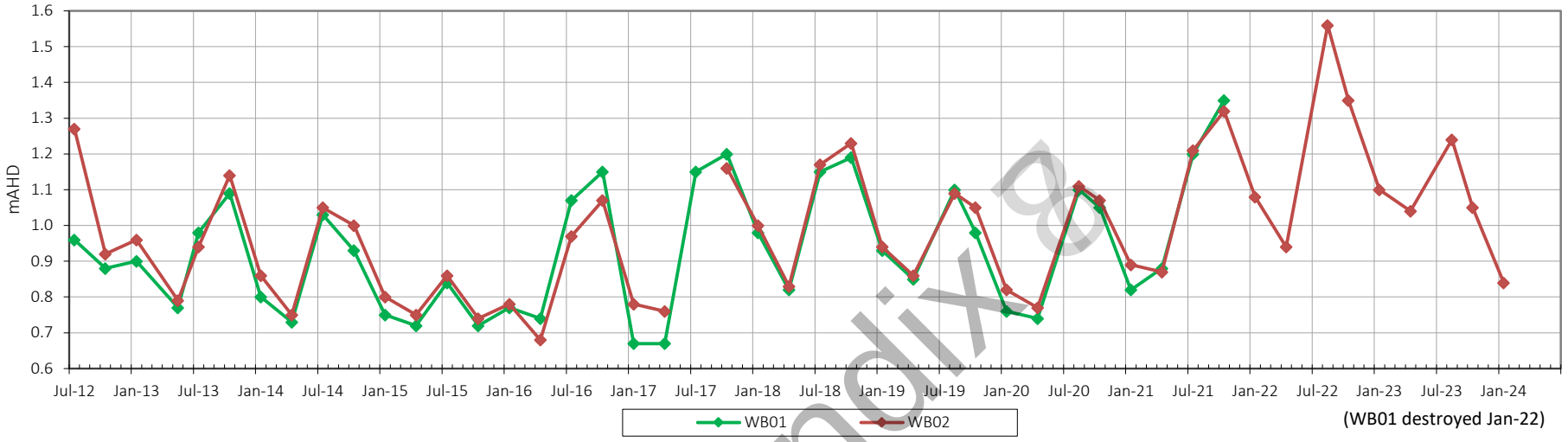
Persons or agencies that rely on or use this document for purposes or reasons other than those agreed by Terrestrial Ecosystems and its client without first obtaining prior consent, do so at their own risk and Terrestrial Ecosystems denies all liability in tort, contract or otherwise for any loss, damage or injury of any kind whatsoever (whether in negligence or otherwise) that may be suffered as a consequence.

APPENDIX 7

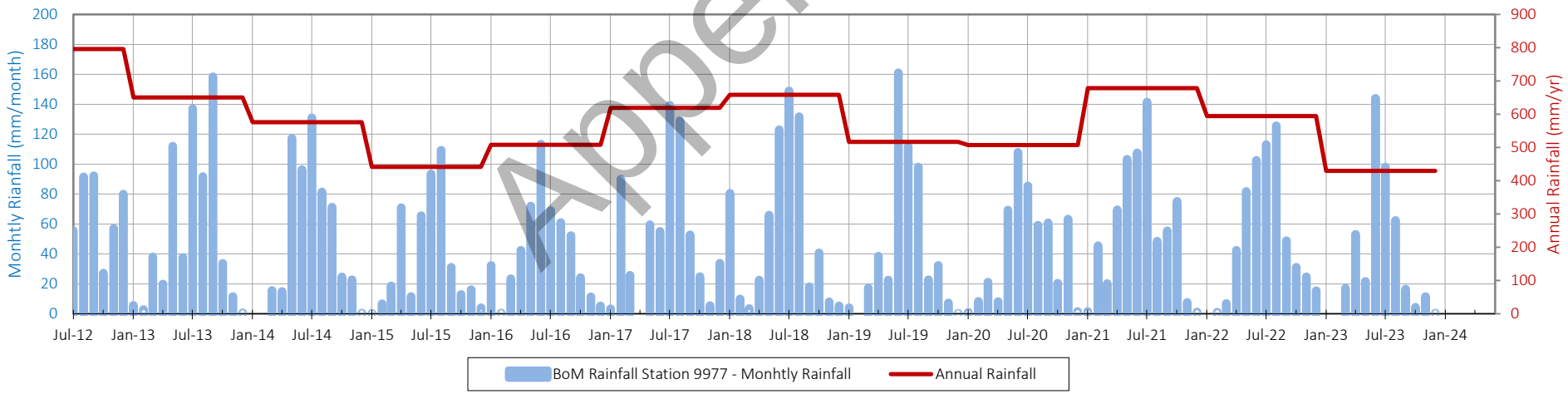
FORESHORE RESERVE GROUNDWATER LEVELS

Wetland Bores - Groundwater Levels 2023

Groundwater Levels (mAHD)



Rainfall (mm)



Appendix B

Job No. J7606

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Peet Golden Bay Pty Ltd and Housing Authority
Golden Bay Groundwater Monitoring

Figure 1: Groundwater Levels in Wetland Bores 2012 - 2023

APPENDIX 8

LANDSCAPE PROTECTION AREA

FLORA, VEGETATION AND WEED MONITORING SURVEY 2023

Appendix 8

GOLDEN BAY LANDSCAPE PROTECTION AREA

VEGETATION MONITORING REPORT 2023

Prepared for:	Peet Golden Bay Pty Ltd and DevelopmentWA
Report Date:	19 January 2024
Version:	1
Report No.	2024-801

Appendix 8

pgv ENVIRONMENTAL

CONTENTS

Contents i
List of Attachments ii
1 INTRODUCTION 1
2 NATIVE VEGETATION MONITORING 2
2.1 Monitoring Sites 2
2.2 Results 2
2.3 Assessment Against Performance Indicators 3
3 REVEGETATION MONITORING 4
3.1 Revegetation Areas 4
3.2 Monitoring Methods 4
3.3 Results 4
3.4 Assessment Against Performance Indicators 5
4 Conclusions and Recommendations 6
4.1 Native Vegetation 6
4.2 Rehabilitated Areas 6

Appendix 8

LIST OF ATTACHMENTS

Tables

Table 1. Native Vegetation Quadrat Monitoring Data

Table 2. Revegetation Quadrat Monitoring Data

Plates

Plate 1: Progress of Revegetation in the 2020 Planted Area

Figures

Figure 1: Quadrat Locations

Appendix

Appendix 1: Quadrat Monitoring Data

Appendix 2: Quadrat Photo Comparisons

Appendix 8

1 INTRODUCTION

Peet Golden Bay Pty Ltd and Western Australian Land Authority as agent of the Housing Authority (trading as DevelopmentWA) are developing Lot 9027 Dampier Drive, Golden Bay for residential purposes. The development includes the retention of native vegetation and significant local landforms in a Landscape Protection Area (LPA).

A Landscape Protection Area Management Plan has been prepared to guide the management of the Landscape Protection Area (LPA) (PGV Environmental, 2023). In addition, a Baseline Flora, Vegetation and Weed Survey has been undertaken for the LPA (PGV Environmental, 2021).

Most of the management actions outlined in the LPA Management Plan have been completed, including fencing areas of native vegetation, installation of walk trails and an exercise staircase to the top of the hill in the Central Dune Area. Public use of the walk trails, and particularly the exercise staircase is high.

The LPA Management Plan requires the monitoring of the eight vegetation quadrats established in the Baseline Survey as well as monitoring the progress of rehabilitation in cleared areas of the LPA.

This Vegetation Monitoring Report provides the results of the vegetation and rehabilitation monitoring undertaken in 2023.

Appendix 8

2 NATIVE VEGETATION MONITORING

2.1 Monitoring Sites

Eight 10m x 10m quadrats were established in 2020 as part of the baseline flora, vegetation and weed survey. The eight quadrats were located in three different vegetation types in the four sections of the LPA, ie. the Central Dune, Western Interface, South Western Interface and Mandurah Hill (Figure 1).

Seven of the eight quadrats were able to be located for the 2023 survey. Quadrat GB6 was removed during the clearing of the northern lower slopes of Mandurah Hill to create a better interface with the residential area. A new monitoring quadrat was established in 2023, very close to where the original GB6 was located.

2.2 Results

A summary of the quadrat data is provided in Table 1. Quadrat data are provided in Appendix 1.

Photo comparisons between the 2020 baseline survey and 2023 survey are provided in Appendix 2.

Table 1: Native Vegetation Quadrat Monitoring Data

Quadrat	Native Species		Native Cover (%)		Weed Species		Weed Cover (%)	
	2020	2023	2020	2023	2020	2023	2020	2023
GB1	22	17	60	61	10	9	13	13
GB2	15	11	100	100	4	3	3	2
GB3	18	11	57	67	5	4	71	70
GB4	17	15	95	52	10	6	61	60
GB5	25	22	100	100	9	9	5	5
GB6*	26	20	91	83	9	9	7	7
GB7	24	15	90	89	5	4	15	15
GB8	15	12	100	100	9	8	28	52

* New quadrat in 2023

In summary, the condition of the vegetation in all quadrats was very similar in 2023 compared to the baseline survey in 2020. The percentage cover of native species remained high in all quadrats. The number of native species in all quadrats was lower in 2023. This can be explained by the different seasons in 2020 and 2023. The monitoring dates for the 2020 and 2023 surveys were very similar, with monitoring occurring on 16 October in 2020 and 19 October in 2023. However, the spring rainfall in 2023 was very low from early September onwards and many ephemeral species had finished flowering in 2023, affecting the overall number of native species recorded in the quadrats compared to 2020.

The number of weed species in the quadrats quadrat and percentage cover of weeds was generally the same apart from quadrat GB8 which recorded a higher coverage of grassy weeds.

Three Priority weed species were identified in the quadrats in 2023 as follows.

- Geraldton Carnation Weed (*Euphorbia terracina*) – 3 quadrats
- Rose Pelargonium (*Pelargonium capitatum*) – 6 quadrats
- Branched Onion Weed (*Trachyandra divaricata*) – 3 quadrats

Appendix 8

Most of the Priority weed cover was <1% with only one coverage of 1% in one of the quadrats.

2.3 Assessment Against Performance Indicators

The LPA Management Plan contains the following Performance Indicators with respect to native vegetation and weeds in the LPA:

- No decline in the number of species, percentage cover and condition of vegetation
- No invasive Century Plant of Narrow-leafed Cottonbush
- Significant reduction of other Priority weeds

The percentage cover and condition of the native vegetation has not changed since 2020. The number of native species was lower, which was explained by the very dry early spring of 2023 causing many ephemeral species to die out before the mid-October monitoring period.

No Century Plant of Narrow-leafed Cottonbush was recorded in the LPA.

Priority weeds remain at <1% in the LPA and do not need any specific weed control measures in 2024.

Appendix 8

3 REVEGETATION MONITORING

3.1 Revegetation Areas

Batter slopes were created in northwestern end of the Central Dune in 2020 and along the northern side of the South Western Interface and Mandurah Hill areas in 2023. All areas were stabilised with mulch and planted with native tubestock.

3.2 Monitoring Methods

Three 10m x 10m monitoring quadrats were established in the three batter slope areas in October 2023 (Figure 1). The quadrats were assessed for native and weed species presence, height and percentage cover.

3.3 Results

A summary of the quadrat data is provided in Table 2. Quadrat data are provided in Appendix 1.

Quadrat photos are provided in Appendix 2.

Table 2: Revegetation Quadrat Monitoring Data

Quadrat	Year Planted	Native Species 2023	Native Cover (%) 2023	Weed Species 2023	Weed Cover (%) 2023
GB9	2023	12	1	7	60
GB10	2023	9	<1	4	<1
GB11	2020	12	10	4	<1

The number of native species in all three areas is good and includes large and medium-sized shrub species as well as ground covers and sedges. The progress of revegetation in the area revegetated in 2020 shows the native vegetation filling out with potential to grow into the denser low heath structure typical of native vegetation in the LPA (Plate 1).

The high percentage of weeds in quadrat GB9 is made up of two species, *Solanum nigrum* and *Dischisma arenarium.* Both species commonly invade cleared sandy areas on the Swan Coastal Plain and should not be an issue for the growth of native plants in this area. The low percentage cover of weeds in the older revegetation area is good and likely due to the good quality of mulch and maintenance of weed species by the landscape contractors.

Appendix 8

Plate 1: Progress of Revegetation in the 2020 Planted Area



3.4 Assessment Against Performance Indicators

The LPA Management Plan contains the following Performance Indicators with respect to areas of revegetation:

- At least 75% survival of planted tubestock within each revegetation area.

The number of tubestock planted in each of the monitoring quadrats is not known as the quadrats were established after the planting was done. Therefore, we propose to monitor the native species present and percentage cover each year to see if the rehabilitation areas are likely to regenerate to a structure and composition similar to the native vegetation in the LPA.

It is too early to assess whether the areas revegetated in 2023 will continue to mature to a naturally vegetated structure. The area revegetated in 2023 shows good progress towards growing into a low heath structure with species similar to those in the native areas of the LPA.

Appendix 8

4 Conclusions and Recommendations

4.1 Native Vegetation

The 2023 monitoring of quadrats established in areas of native vegetation have shown the following results:

- The native vegetation remains in very good condition in the 3 years since the baseline monitoring was established. This is an encouraging result given that the public use of the LPA has increased with the installation of walk trails and exercise stairs in the Central Dune Area;
- Priority weed species cover and distribution is similar to baseline and overall remains very low. No weed control for Priority species is necessary for 2024; and
- Monitoring in 2024 will need to consider the seasonal rainfall pattern in spring and may need to be done earlier than mid-October if spring is dry.

4.2 Rehabilitated Areas

The 2023 monitoring of quadrats established in areas of revegetation in 2020 and 2023 have shown the following results:

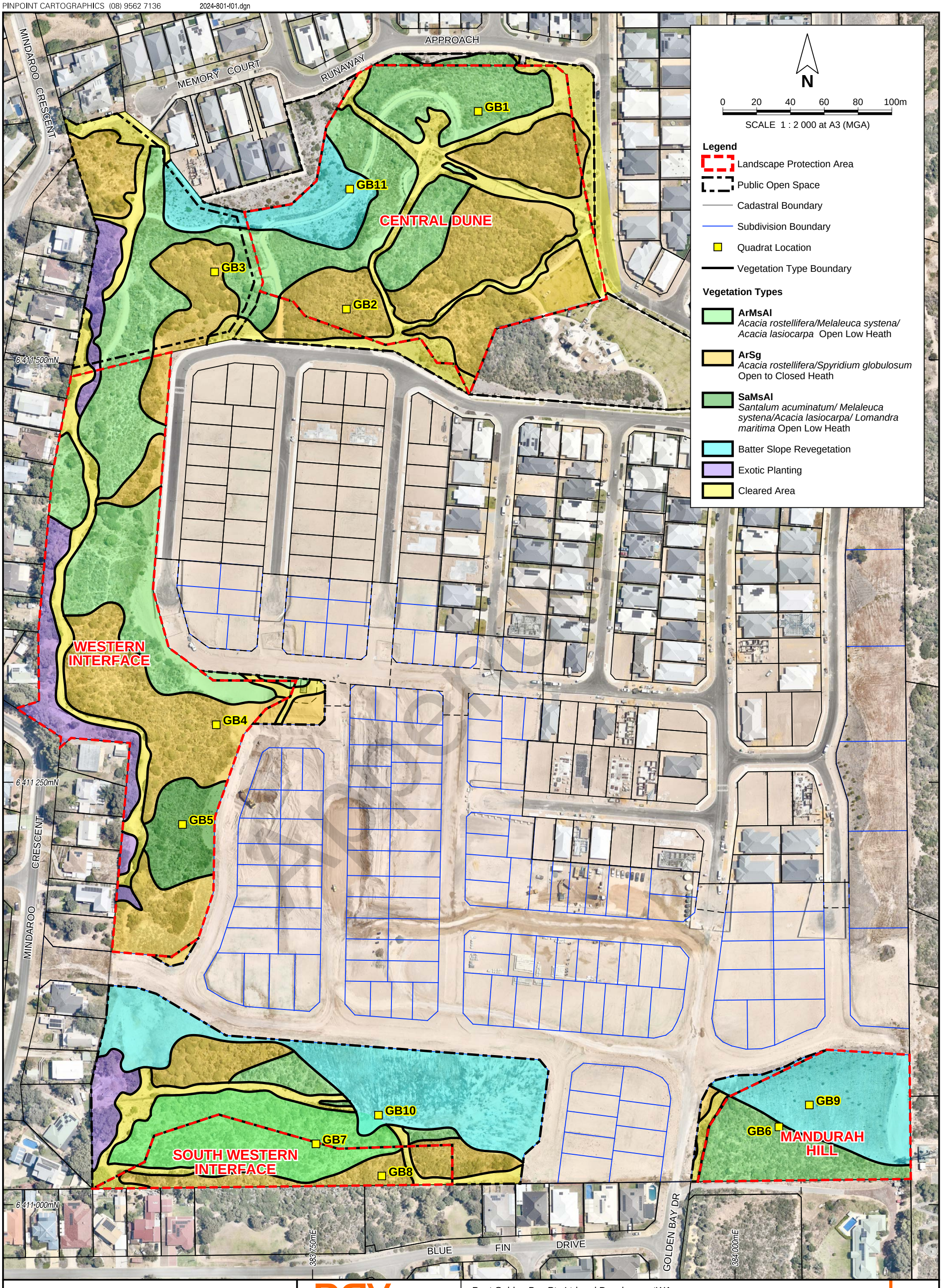
- The revegetation areas contain a range of native species including large and medium-sized shrub species as well as ground covers and sedges;
- Monitoring should be done in early 2024 to determine how the tubestock have survived after an extended dry period in Perth over spring and summer;
- If survival over the summer period is determined to be very low, then in-fill planting will be needed in 2024;
- The area planted in 2020 is showing good progress in growing into a low heath structure with few weeds.

Appendix 8

FIGURES

Appendix 8

PINPOINT CARTOGRAPHICS (08) 9562 7136 2024-801-f01.dgn



CADASTRAL SOURCE: Landgate, January 2024.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown December 2023.
SUBDIVISION SOURCE: EPCAD, Lot 3 Landscape Mater Plan, 06-07-20.

pgv ENVIRONMENTAL

Drawn: P. van der Moezel | Date: 19 Jan 2024
Job: 10004 Rpt: 2024-801 | Revision: A

Peet Golden Bay Pty Ltd and DevelopmentWA
LANDSCAPE PROTECTION AREA VEGETATION MONITORING REPORT 2023
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

MONITORING QUADRAT LOCATIONS

Figure 1

APPENDIX 1

Quadrat Monitoring Data

Appendix 8

QUADRAT GB 1

50 383848 E 6411647 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Excellent
Soil Type: Light brown sand
Landform: Steeply sloping down to the north-east
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg SW corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1	20
Melaleuca systena	1	15
Austrostipa flavescens	1.1	2
Spyridium globulosum	0.8	1
Acacia lasiocarpa	0.5	10
**Bromus diandrus*	0.4	10
**Euphorbia terracina*	0.4	1
**Lagurus ovatus*	0.4	1
**Lolium perenne*	0.4	<1
Phyllanthus calycinus	0.4	<1
**Pelargonium capitatum*	0.4	<1
Asteridea pulverulenta	0.4	<1
Acanthocarpus preissii	0.3	5
Lomandra maritima	0.3	2
Conostylis candicans	0.3	1
Senecio pinnatifolius		
Scaevola thesioides	0.3	1
Leptorhynchos scaber		

SPECIES	HEIGHT (m)	COVER (%)
Lobelia tenuior	0.3	<1
Olearia axillaris	0.3	<1
**Trachyandra divaricata*	0.3	<1
**Lysimachia arvensis*	0.2	1
Opercularia vaginata	0.2	<1
**Sonchus oleraceus*	0.2	<1
**Bellardia trixago*	0.2	<1
Isolepis marginata	<0.1	<1
Cassytha flava	Climber	2
Clematis linearifolia	Climber	2

* introduced species

Appendix 8

QUADRAT GB 2

50 383770 E 6411530 N

Vegetation: *Acacia rostellifera/Spyridium globulosum/Diplolaena dampieri* Closed Heath over *Lepidosperma gladiatum* Sedgeland
Condition: Very Good
Soil Type: Light brown sand
Landform: Steeply sloping down to the south
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NW corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1.8	60
Spyridium globulosum	1.8	30
Poa poiformis	0.8	<1
Melaleuca systena	0.6	1
Austrostipa flavescens	0.6	<1
Acanthocarpus preissii	0.4	5
Rhagodia baccata	0.4	2
**Lolium perenne*	0.3	2
**Lagurus ovatus*	0.3	<1
Conostylis candicans	0.3	<1
**Sonchus oleraceus*	0.3	<1
Parietaria debilis	0.2	<1
Clematis linearifolia	Climber	20
Hardenbergia comptoniana	Climber	<1

* introduced species

App

QUADRAT GB 3

50 383692 E 6411552 N

Vegetation: *Spyridium globulosum/Acacia rostellifera* Open Heath over weeds
Condition: Degraded
Soil Type: Dark brown-black sand
Landform: Depression between dunes
Date: 19.10.23
Recorder: Paul van der Moezel



Quadrat (10 x 10m) Peg NE corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	2.5	10
Spyridium globulosum	2.2	40
Olearia axillaris	1.5	10
Austrostipa flavescens	1.1	2
Melaleuca systena	1	1
**Bromus diandrus*	0.4	50
**Lolium perenne*	0.4	20
Diplolaena dampieri	0.4	1
Acanthocarpus preissii	0.4	1
Rhagodia baccata	0.3	1
Senecio pinnatifolius		
Lobelia tenuior	0.3	<1
**Sonchus oleraceus*	0.3	<1
Caladenia latifolia		
Opercularia vaginata	0.2	<1
Daucus glochidiatus		
**Dischisma arenarium*	0.1	1
Hardenbergia comptoniana	Climber	1

* introduced species

QUADRAT GB 4

50 383693 E 6411284 N

Vegetation: *Acacia rostellifera/Spyridium globulosum* Open Heath over weeds
Condition: Good
Soil Type: Cream sand
Landform: Upper slope of low dune
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NE corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1.5	30
Hibbertia cuneiformis	1.1	<1
Santalum acuminatum	1	1
Alyxia buxifolia	1	<1
Austrostipa flavescens	0.7	2
Poa porphyroclados	0.7	<1
Melaleuca systena	0.6	5
Spyridium globulosum	0.5	2
**Bromus diandrus*	0.4	40
**Lolium perenne*	0.4	20
Opercularia vaginata	0.4	2
Phyllanthus calycinus	0.4	<1
Thysanotus triandrus	0.4	<1
Acanthocarpus preissii	0.4	<1
**Pelargonium capitatum*	0.4	<1
Caladenia latifolia		
**Lagurus ovatus*	0.3	<1
Daucus glochidiatus	0.2	<1
**Sonchus oleraceus*	0.2	<1

Appe

SPECIES	HEIGHT (m)	COVER (%)
**Fumaria capreolata*	Climber	<1
Cassytha racemosa	Climber	10
Hardenbergia comptoniana	Climber	<1

* introduced species

Appendix 8

QUADRAT GB 5

50 383673 E 6411225 N

Vegetation: *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath
Condition: Very Good
Soil Type: Brown sand, some surface limestone
Landform: Lower slope of tall dune
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NE corner

SPECIES	HEIGHT (m)	COVER (%)
Santalum acuminatum	0.8	10
Austrostipa flavescens	0.8	1
Poa porphyroclados	0.6	<1
Melaleuca systena	0.5	30
Trymalium ledifolium	0.5	5
Hakea prostrata	0.5	2
Phyllanthus calycinus	0.5	<1
Acanthocarpus preissii	0.4	10
Acacia lasiocarpa	0.4	5
Gompholobium tomentosum	0.4	<1
Leucopogon parviflorus	0.4	<1
**Euphorbia terracina*	0.4	<1
**Bromus diandrus*	0.4	<1
Senecio pinnatifolius	0.4	<1
Lomandra maritima	0.3	30
Opercularia vaginata	0.3	2
**Lolium perenne*	0.3	1
Olearia axillaris	0.3	<1

SPECIES	HEIGHT (m)	COVER (%)
**Trachyandra divaricata*	0.3	<1
Thysanotus sparteus	0.3	<1
Lobelia tenuior	0.3	<1
**Pelargonium capitatum*	0.3	<1
Conostylis candicans	0.2	1
**Bellardia viscosa*	0.2	<1
**Heliophila pusilla*		
**Lagurus ovatus*	0.2	<1
Lepidosperma calcicola	0.2	2
Desmocladus flexuosus	0.1	10
**Minuartia mediterranea*	<0.1	4
Hardenbergia comptoniana	Climber	<1
Clematis linearifolia	Climber	<1

* introduced species

Appendix 8

QUADRAT GB 6

50 384026 E 6411046 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Very Good
Soil Type: Light brown sand
Landform: Mid-slope, sloping down to the north-west
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NE corner

SPECIES	HEIGHT (m)	COVER (%)
Spyridium globulosum	1.2	1
Acacia rostellifera	1	20
Austrostipa flavescens	0.6	2
Acacia lasiocarpa	0.5	10
Melaleuca systena	0.5	5
**Bromus diandrus*	0.5	2
Thysanotus sparteus	0.5	<1
Lomandra maritima	0.4	30
**Lolium perenne*	0.4	5
Trymalium ledifolium	0.4	5
**Avena fatua*	0.4	<1
Gompholobium tomentosum	0.4	<1
**Ehrharta longiflora*	0.4	<1
Phyllanthus calycinus	0.4	<1
Acanthocarpus preissii	0.3	10
Scaevola thesioides	0.3	<1
Conostylis candicans	0.3	<1

SPECIES	HEIGHT (m)	COVER (%)
**Pelargonium capitatum*	0.3	<1
Caladenia sp (finished flowering)	0.3	<1
Desmocladus flexuosus	0.2	1
Lobelia tenuior	0.2	<1
**Lagurus ovatus*	0.2	<1
**Heliophila pusilla*	0.2	<1
Daucus glochidiatus	0.1	<1
**Minuartia mediterranea*	0.1	<1
**Bellardia viscosa*	0.1	<1
Cassytha flava	Climber	<1
Hardenbergia comptoniana	Climber	<1
Clematis linearifolia	Climber	<1

* introduced species

Appendix 8

QUADRAT GB 7

50 383752 E 6411036 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Very Good
Soil Type: Grey sand
Landform: Upper slope of tall dune
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg SE corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	0.7	15
Austrostipa flavescens	0.7	1
Poa porphyroclados	0.6	<1
Rhagodia baccata	0.5	<1
Lomandra maritima	0.4	20
**Bromus diandrus*	0.4	10
Melaleuca systena	0.4	5
**Trachyandra divaricata*	0.4	<1
Acanthocarpus preissii	0.3	20
Opercularia vaginata	0.3	15
**Lolium perenne*	0.3	5
Conostylis candicans	0.3	2
Thysanotus sparteus	0.3	<1
Scaevola thesioides	0.3	<1
Senecio pinnatifolius	0.3	<1
Lobelia tenuior	0.2	<1
Hemiandra pungens	0.1	5

SPECIES	HEIGHT (m)	COVER (%)
**Pelargonium capitatum*	0.1	<1
Clematis linearifolia	Climber	5
Hardenbergia comptoniana	Climber	1

* introduced species

Appendix 8

QUADRAT GB 8

50 383791 E 6411017 N

Vegetation: *Acacia rostellifera/Spyridium globulosum* Closed Heath
Condition: Good
Soil Type: Grey sand
Landform: Mid-slope, steeply sloping down to the south
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NW corner

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	3.5	70
Spyridium globulosum	0.6	10
Austrostipa flavescens	0.6	1
Rhagodia baccata	0.5	15
**Lolium perenne*	0.5	20
**Sonchus oleraceus*	0.5	<1
**Bromus diandrus*	0.4	20
**Ehrharta longiflora*	0.4	10
Melaleuca systena	0.4	<1
Trymalium ledifolium	0.4	<1
Acanthocarpus preissii	0.4	1
**Pelargonium capitatum*	0.4	<1
**Centranthus macrosiphon*	0.3	2
Conostylis candicans	0.3	1
**Euphorbia terracina*	0.3	<1
Parietaria debilis	0.3	<1
Daucus glochidiatus	0.2	<1
Clematis linearifolia	Climber	20
Hardenbergia comptoniana	Climber	1

Appe

SPECIES	HEIGHT (m)	COVER (%)
**Fumaria capreolata*	Climber	<1

* introduced species

Appendix 8

QUADRAT GB 9

50 384044 E 6411059 N

Vegetation: Revegetation Area – Planted 2023
Condition:
Soil Type: Grey sand
Landform: Mid-slope, steeply sloping down to the north
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg SW corner

SPECIES	HEIGHT (m)	COVER (%)
Ficinia nodosa	0.4	<1
Acacia saligna	0.3	<1
Olearia axillaris	0.3	<1
Rhagodia baccata	0.3	<1
Templetonia retusa	0.3	<1
Myoporum insulare	0.3	<1
**Lolium perenne*	0.3	<1
**Sonchus oleraceus*	0.3	<1
Conostylis candicans	0.2	<1
Acacia cochlearis	0.2	<1
Atriplex sp	0.1	1
Eremophila glabra	0.1	<1
Senecio pinnatifolius	0.1	<1
**Pelargonium capitatum*	0.1	<1
**Lysimachia arvensis*	0.1	<1
**Solanum nigrum*	<0.1	50
**Dischisma arenarium*	<0.1	10
**Isolepis marginata*	<0.1	<1
Hardenbergia comptoniana	Climber	<1

* introduced species

Appe

QUADRAT GB 10

50 383789 E 6411053 N

Vegetation: Revegetation Area – Planted 2023
Condition:
Soil Type: Grey sand
Landform: Mid-slope, steeply sloping down to the north
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg SW corner

SPECIES	HEIGHT (m)	COVER (%)
Ficinia nodosa	0.4	<1
Acacia cyclops	0.3	<1
Myoporum insulare	0.3	<1
**Trachyandra divaricata*	0.3	<1
**Lolium perenne*	0.3	<1
Rhagodia baccata	0.2	<1
Spyridium globulosum	0.2	<1
Leucophyta brownii	0.2	<1
Acacia cochlearis	0.1	<1
Scaevola canescens	0.1	<1
Templetonia retusa	0.1	<1
**Pelargonium capitatum*	<0.1	<1
**Dischisma arenarium*	<0.1	<1

* introduced species

Appe

QUADRAT GB 11

50 383772 E 6411601 N

Vegetation: Revegetation Area – Planted 2020
Condition:
Soil Type: Grey sand
Landform: Mid-slope, steeply sloping down to the north-west
Date: 19.10.23
Recorder: Paul van der Moezel



QUADRAT (10 x 10m) Peg NE corner

SPECIES	HEIGHT (m)	COVER (%)
Scaevola crassifolia	0.7	2
Acacia cyclops	0.6	2
Eremophila glabra	0.6	1
Ficinia nodosa	0.5	2
Conostylis candicans	0.5	<1
Leucophyta brownii	0.3	2
Callitris preissii	0.3	<1
Olearia axillaris	0.3	<1
**Euphorbia terracina*	0.3	<1
**Lolium perenne*	0.3	<1
Myoporum insulare	0.2	1
Rhagodia baccata	0.2	<1
Grevillea crithmifolia	0.2	<1
Acacia cochlearis	0.1	<1
**Sonchus oleraceus*	0.1	<1
**Orobanche minor*	0.1	<1

* introduced species

Appe

APPENDIX 2

Quadrat Photo Comparisons

Appendix 8

GB1 2020



GB1 2023



GB2 2020



GB2 2023



GB3 2020



GB3 2023



GB4 2020



GB4 2023



GB5 2020



GB5 2023



GB6 2020



GB6 2023 (new location)



GB7 2020



GB7 2023



GB8 2020



GB8 2023



Appe

Appendix 8

APPENDIX 9

LANDSCAPE PROTECTION AREA MANAGEMENT PLAN

GOLDEN BAY LANDSCAPE PROTECTION AREA

MANAGEMENT PLAN

Prepared for:	Peet Golden Bay Pty Ltd
	Department of Communities
Report Date:	3 July 2024
Version:	5
Report No.	2021-597

Appendix 9

pgv ENVIRONMENTAL

CONTENTS

Contents i

List of Attachments iii

1 INTRODUCTION 1

1.1 Background 1

1.2 Location 2

1.3 Scope of Work 2

2 LANDSCAPE PROTECTION AREAS 4

2.1 General Description 4

2.1.1 Central Dune 4

2.1.2 Western Interface 4

2.1.3 South Western Interface 5

2.1.4 Mandurah Hill Area 5

3 EXISTING ENVIRONMENT 6

3.1 Topography and Landform 6

3.2 Vegetation 6

3.2.1 Vegetation Complex 6

3.2.2 Vegetation Types 6

3.2.3 Vegetation Condition 8

3.3 Conservation Significance of Flora and Vegetation 9

3.3.1 Flora 9

3.3.2 Vegetation 9

3.4 Significant Weed Species 9

3.4.1 Mandurah Hill Area 10

3.4.2 South Western Interface 10

3.4.3 Western Interface 10

3.4.4 Central Dune 10

3.5 Fauna 11

3.5.1 Fauna Habitat 11

3.5.2 Fauna Species 12

3.5.3 Southern Brown Bandicoot 14

4 MANAGEMENT PLAN 15

4.1 Landscape Master Plan 15

Appendix 9

4.2 Objective 15
4.3 Timeframes 15
4.4 Responsibilities 15
4.5 Management Actions 16
4.5.1 Access 16
4.5.2 Habitat Rehabilitation 17
4.5.3 Weed Control 18
4.5.4 Fauna Management 23
4.5.5 Feral Fauna Management 23
4.5.6 Fencing 23
4.5.7 Firebreak 23
4.5.8 Post Construction 24
4.6 Monitoring 28
4.7 Targets and Performance Indicators 29
4.8 Contingencies 29
4.9 Implementation Schedule 30
4.10 Reporting 30
5 REFERENCES 31

Appendix 9

LIST OF ATTACHMENTS

Tables

Table 1: Vegetation Condition Rating Scale.

Table 2: Vertebrate fauna caught in previous trapping programs in the region

Table 3: Feral and pest species likely to occur on the site

Table 4: Rehabilitation Species List

Plates

Plate 1: *Acacia rostellifera/Spyridium globulosum* Open to Closed Heath

Plate 2: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath

Plate 3: *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath

Plate 4: Very Good Fauna Habitat

Plate 5: Juvenile Quenda (photo source: Terrestrial Ecosystems)

Plate 6: *Lepidosperma gladiatum* (Coastal Sword Sedge) Photo source Florabase 2021

Plate 7: *Gomphocarpus fruticosus* (Narrow-leafed Cottonbush) Source Florabase 2021

Figures

Figure 1: Site Location

Figure 2: LPA Areas and Adjacent Bushland POS

Figure 3: Vegetation Types

Figure 4: Vegetation Condition

Figure 5: Management Plan

Appendices

Appendix 1: Ministerial Statement 297

Appendix 2: Landscape Protection Area Approvals

Appendix 3: Landscape Protection Area Management Plan 1994

Appendix 9

Appendix 4: Landscape Masterplan V14

Appendix 5: Baseline Flora, Vegetation and Weed Survey

Appendix 6: City of Rockingham Fencing Requirements

Appendix 7: Civil design for Interface

Appendix 9

1 INTRODUCTION

1.1 Background

The urban development of Lots 2 and 3 Warnbro Sound Avenue, Golden Bay was subject to a Public Environmental Review (EPA Assessment 604) and was approved through Ministerial Statement 297 (MS 297) in January 1993 (Appendix 1). Condition 4 of the Ministerial Statement 297 relates to landscape protection and states the following:

> 4. *Landscape Protection*
> *The landscape value of the parabolic dune ridge on the eastern edge of Golden Bay should be recognised.*
> *4-1 Prior to subdivision approval, the proponent shall liaise with the Department of Planning and Urban Development and the City of Rockingham to incorporate planning measures which recognise and protect the landscape value of the parabolic dune ridge on the eastern edge of Golden Bay, to the requirements of the Minister for the Environment and the Minister for Planning on the advice of Department of Planning and Urban Development, the City of Rockingham and the Environmental Protection Authority.*

The Minister for the Environment determined that a committee should be set up to inform the Minister for Planning and himself with advice regarding the clearance of the condition. The Minson Committee was established with six members who met three times to determine the landscape value of the parabolic dune ridge based on the following:

- Its physical shape, size, form, vegetation and the aesthetic appeal which derives from these features;
- The conspicuous relief it provides in the generally flat Rockingham topography; and
- Its protective buffer qualities (in terms of development).

The proponent at that time, H and B Developments, was asked to provide a number of options which could achieve the intent of the environmental condition. Four options were provided to the committee for deliberation. Each committee member consulted extensively with their respective agencies and were asked to each provide a report with their preferred option.

The committee came to an agreed position and provided a report to the Minister for the Environment and the Minister for Planning. It was agreed by the committee that appropriate management would be required to ensure that the are set aside for landscape protection is managed for that purpose and that this matter would be addressed at the time of subdivision by the planning process.

The Minister for the Environment approved the landscape protection area as the 'area of agreement' and the land identified as the 'area of disagreement' was considered suitable for residential development and did not need to be protected for its landscape features (Appendix 2). Condition 4 was cleared by the Minister on 25 November 1993.

The proponent moved forward with preparing a Golden Bay Comprehensive Development Plan (CDP) to guide the future development of Lots 2 and 3. The CDP retained the landscape protection area as

Appendix 9

required under Condition 4 of the Ministerial Statement. As directed by the Minister for Environment the management of the landscape protection area was to be addressed though the planning process, as such a Landscape Protection Area Management Plan (LPA MP) was submitted as part of the CDP. The LPA MP addressed the physical retention of the landforms and the management of access and their use. To retain the central landforms there were substantial level changes to be managed and modifications to the lower slopes of the dunes were detailed to reduce the need for retaining structures and to allow for public access in the form of a small park.

The CDP was approved by the City of Rockingham (City) on 25 August 1994 and by the State Planning Commission on 29 September 1994. The CDP retained the landscape protection areas in accordance with MS 297. The City approved the LPA MP that was submitted by Mitchell Goff and Associates in November 1994 (Appendix 3).

Given the nearly 27-year age of the LPA MP, the developers have committed to preparing an updated Management Plan for the Landscape Protection Area (LPA). As part of the preparation of the updated Management Plan, a Baseline Flora, Vegetation and Weed Survey was undertaken in 2020 to provide a description of the status of the vegetation in the LPA and to assist in identifying any management actions to be included in the Management Plan.

A Landscape Masterplan for the LPA and adjacent Public Open Space (POS) has been approved by the City in 2021 (Appendix 4). The masterplan provides the framework for public access and recreation associated with the LPA.

1.2 Location

Lot 9027 (part of original Lot 3) Dampier Drive Golden Bay is located approximately 20km south of the Rockingham City Centre (Figure 1) in the City of Rockingham. Lot 9027 is bound by future development to the east, the existing Golden Bay to the south and west and the new Golden Bay development to the north (Figure 2).

The Lot is zoned for urban development in the Metropolitan Region Scheme and the City of Rockingham Town Planning Scheme No 2. A CDP has been approved for the Lot with modifications to the southern area through a subdivision approval (WAPC 158634) on 4 November 2019. The CDP includes a mix of residential lots, Public Open Space and the LPA.

1.3 Scope of Work

PGV Environmental were engaged by Peet Golden Bay Pty Ltd to revise the 1994 LPA MP which was a commitment made during the revision to the CDP over Lot 9027. The LPA MP is to provide for the ongoing management of the LPA and will address the following in accordance with the CDP approval:

- revegetation areas and priorities (based on Landscape Masterplan V14);
- the extent of any weed species that may be present and any weed control measures that may be required;
- any feral animal control measures that may be required;
- any measures that may need to be put in place to control access (fencing, gates, and consolidated tracks) by pedestrians, maintenance, and emergency response;
- any signage that may be required (for educational and/or safety purposes);

Appendix 9

- Implementation schedule and reporting for the three stages of development (pre works, during works, post works) and
- any monitoring/contingency measures that may be required and any key performance indicators that may apply; and responsibilities and timeframes.

Appendix 9

2 LANDSCAPE PROTECTION AREAS

2.1 General Description

The areas of the LPA were chosen for a number of reasons, primarily for the retention of significant landscape features and also to provide a buffer to the existing houses in Golden Bay (as they were in 1994). The LPA contains four areas, described in the original Management Plan as (Figure 2):

- The retained Central Dune;
- The Western Interface Reserve;
- The South Western Face or Southern Boundary; and
- The Mandurah Hill Area

These names have been retained with slight modification in this report.

Additional Public Open Space (POS) has been added to the eastern side of the Central Dune and to the northern side of the South Western Face that effectively enlarges the LPA from its original approved size.

Some sections of the LPA required vegetation to be cleared to provide a stable interface between the residential development and the steep dunes of the LPA. Some earthworks into the LPA were deemed to be acceptable in the original Management Plan. These areas on the northern and eastern side of the LPA adjacent to the first stages of development will be cleared, re-graded and revegetated. A second area to the south will require some clearing and earthworks to tie the LPA into the development levels (Figure 3). The earthworks were approved by the City through the engineering and landscape design (Appendices 4 and 7).

The total area of the LPA, including the adjacent Bushland POS in the South Western Area is around 15.5ha.

2.1.1 Central Dune

The Central Dune area contains the highest parts of the Lot with to peaks at 34-37m AHD. The land slopes down steeply to the north, east and south of the peaks. The area slopes more gently down to the west and joins up with the Western Interface part of the LPA.

2.1.2 Western Interface

The Western Interface area extends north-south along the central western boundary of the Lot for approximately 420m and varies in width from 60m – 150m. The landform is more undulating than the Central Dune area with some dune ridges and swales ranging in elevation from 11-22m AHD.

The northern end of the Western Interface area has already been ceded as a Conservation Reserve to the City of Rockingham.

Appendix 9

2.1.3 South Western Interface

The South Western Interface extends along the south-western part of the Lot and includes a small original LPA section and a larger POS section. The LPA section is only about 30m wide from north to south and includes a narrow west-east ridge that slopes steeply down to the south and north. As a result of the steep contours an additional area of POS was added, making the area 80-120m wide.

2.1.4 Mandurah Hill Area

The south-east area of the LPA includes a portion of Mandurah Hill which has its peak at 42m AHD very close to the south-eastern boundary of the area. The Mandurah Hill area slopes down from the high point in the south-east corner to low points on the western and northern boundaries around 23m AHD.

Appendix 9

3 EXISTING ENVIRONMENT

3.1 Topography and Landform

The topography of the LPA is highly undulating with significant peaks and valleys consistent with Quindalup Dune parabolic dune landforms. The highest point in the development is the Central Dune which peaks at 37m AHD (Figure 2).

Some earthworks will be required to tie the levels into the final development levels and to meet the minimum grade requirements set by the City.

3.2 Vegetation

3.2.1 Vegetation Complex

Vegetation Complexes are a broad level of vegetation description which is based on the underlying geomorphology and rainfall (Heddle et al., 1980). The areas of remnant native vegetation on the site are part of the Quindalup Complex which is described as:

> '*Coastal dune complex consisting mainly 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 (Heddle et al., 1980)'.*

3.2.2 Vegetation Types

Three native vegetation types and one area of exotic species were described and mapped on the site during the baseline vegetation survey in 2020 (PGV Environmental, 2020). The vegetation types and description area are described below and shown in Figure 3:

- ArSg *Acacia rostellifera/Spyridium globulosum* Open to Closed Heath

This vegetation type commonly occurred on the mid- to lower slopes and swales on the site. *Acacia rostellifera* was the main shrub up to 2m high and 60-70% cover but *Spyridium globulosum* dominated some patches in the lower swales (photo 2 to the right). *Diplolaena dampieri* was a common tall shrub in some areas. Other common smaller species included *Austrostipa flavescens, Melaleuca systena, Acanthocarpus preissii, Rhagodia baccata, Conostylis candicans, Daucus glochidiatus, Parietaria debilis, Hydrocotyle intertexta* and *Hardenbergia comptoniana.*

- ArMsAl *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath

This vegetation type occurred in one small area that was the only area that contained some surface limestone. However, the plant species did not reflect a typical limestone substrate. *Santalum acuminatum* was the tallest shrub at only 1m and 10% cover with *Melaleuca systena, Acacia lasiocarpa, Acanthocarpus preissii* and *Lomandra maritima* common smaller shrubs around 0.3-0.5m high. *Desmocladus flexuosus* and *Opercularia vaginata* were common ground shrubs.

Appendix 9

- SaMsAl *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath

This vegetation type occurred in one small area that was the only area that contained some surface limestone. However, the plant species did not reflect a typical limestone substrate. *Santalum acuminatum* was the tallest shrub at only 1m and 10% cover with *Melaleuca systena, Acacia lasiocarpa, Acanthocarpus preissii* and *Lomandra maritima* common smaller shrubs around 0.3-0.5m high. *Desmocladus flexuosus* and *Opercularia vaginata* were common ground shrubs.

Plate 1: *Acacia rostellifera/Spyridium globulosum* Open to Closed Heath



Plate 2: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath



Plate 3: *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath



3.2.3 Vegetation Condition

The condition of the vegetation was assessed according to the Keighery system described in Bush Forever (Government of Western Australia, 2000). Keighery's condition rating scale ranges from Pristine where the vegetation exhibits no visible signs of disturbance to Completely Degraded where the vegetation structure in no longer intact and without native plant species (Table 1).

Overall, the condition of the areas of native vegetation in the survey area was high, ranging from Very Good to Good (Figure 4). The number of introduced species throughout the site was relatively high and did not allow an Excellent condition rating to be assigned to any areas.

Some areas had a higher grassy weed understorey, especially in swales and under the *Acacia rostellifera* dense stands and were rated as Good.

Tracks and the western area of non-native tree and shrub plantings were rated as Completely Degraded.

Appendix

Table 1: Vegetation Condition Rating Scale.

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

Source: Government of Western Australia, 2000.

3.3 Conservation Significance of Flora and Vegetation

3.3.1 Flora

No Threatened or Priority species have been recorded on the site.

3.3.2 Vegetation

Vegetation Complex

The vegetation on the site is part of the Quindalup Complex (Heddle *et al.*, 1980). Approximately 60.49% of the pre-European vegetation extent of this complex remains, of which 9.01% is currently managed by DBCA (DBCA, 2018).

The percentage retention is above EPA's target for minimum 30% retention of vegetation complexes State-wide in the Perth and Peel Region Constrained Areas and the area in protection is just below the 10% minimum criteria for vegetation complexes.

Threatened and Priority Ecological Communities

The Floristic Community Type (FCT) for the three vegetation types was determined using the spreadsheet method which compares the species in the quadrats to the species found in each FCT (Table 12 in Gibson *et al.* 1994). The FCT of all three vegetation types had the highest correlation with FCT 29b 'Acacia shrublands on taller dunes, southern Swan Coastal Plain'. FCT 29b is a Priority 3 Ecological Community at State level.

3.4 Significant Weed Species

PGV Environmental mapped the significant weeds on the site in 2020 in accordance with *Standard Operating Procedure Techniques for mapping weed distribution and cover in bushland and wetlands*

Appendix 9

(SOP 22.1) (DEC, 2011) and *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Technical Guidance) (Government of Western Australia, 2016).

The results for the weed survey are provided in Appendix 5 and summarised below.

3.4.1 Mandurah Hill Area

There were no Declared Weed species recorded.

- Overall Weed Coverage in the POS is moderate with areas of heavy infestation along the boundary and a lower weed coverage along the ridge;
- Priority weeds identified in Landscape Protection Area A are:
    - Geraldton Carnation Weed (*Euphorbia terracina*);
    - Rose Pelargonium (*Pelargonium capitatum*); and
    - Branched Onion Weed (*Trachyandra divaricata*).

3.4.2 South Western Interface

No Declared weed species were recorded in the South Western Interface area.

- Overall Weed Coverage is generally moderate to high with areas of less weed coverage in areas that have had less disturbance;
- Priority weeds identified in Landscape Protection Area B are:
    - Geraldton Carnation Weed (*Euphorbia terracina*);
    - Rose Pelargonium (*Pelargonium capitatum*);
    - Branched Onion Weed (*Trachyandra divaricata*);
    - Brazilian Pepper (*Schinus terebinthifolius*);
    - Century Plant (*Agave americium*); and
    - Geraldton Wax (*Chamelaucium uncinatum*).

3.4.3 Western Interface

No Declared weed species were recorded in the Western Interface Area.

- Overall Weed Coverage in the POS is moderate to high on the western side (>5%) and lower on the eastern side with the highest areas of weed coverage along the tracks;
- Priority weeds identified in Landscape Protection Area C are:
    - Geraldton Carnation Weed (*Euphorbia terracina*);
    - Rose Pelargonium (*Pelargonium capitatum*); and
    - Branched Onion Weed (*Trachyandra divaricata*).

3.4.4 Central Dune

There was one Declared weed species recorded in the Central Dune being Narrow-leafed Cottonbush (*Gomphocarpus fruticosus*) with one individual being recorded in the central part of the site.

- Overall Weed Coverage in the POS is low with the highest areas of weed coverage associated with tracks;

Appendix 9

- One Declared Pest under the BAM Act, Narrow-leafed Cottonbush (*Gomphocarpus fruticosus*) was recorded from a single location;
- Priority weeds identified in Landscape Protection Area D are:
    - Geraldton Carnation Weed (*Euphorbia terracina*);
    - Rose Pelargonium (*Pelargonium capitatum*); and
    - Branched Onion Weed (*Trachyandra divaricata*).

3.5 Fauna

3.5.1 Fauna Habitat

There is one broad fauna habitat across the LPA which consists of a mix of *Acacia rostellifera* Closed Scrub (Plate 4) and *Melaleuca systena* Open Shrubland over *Lomandra maritima* Herbland.

Plate 4: Very Good Fauna Habitat



Fauna habitat can be assessed using a number of factors including, the size of the habitat, the level of habitat connectivity, availability of specific resources (e.g. tree hollows) and overall vegetation quality. The habitat was assessed according to the following categories:

> ***High quality fauna habitat*** *– These areas closely approximate the vegetation mix and quality that would have been in the area prior to any disturbance. The habitat has connectivity with other habitats and is likely to contain the most natural vertebrate fauna assemblage.*

> ***Very good fauna habitat*** *- These areas show minimal signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) and generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be minimally affected by disturbance.*

Good fauna habitat *– These areas showed signs of disturbance (e.g. grazing, clearing, fragmentation, weeds) but generally retain many of the characteristics of the habitat if it had not been disturbed. The habitat has connectivity with other habitats and fauna assemblages in these areas are likely to be affected by disturbance.*

Disturbed fauna habitat *– These areas showed signs of significant disturbance. Many of the trees, shrubs and undergrowth are cleared. These areas may be in the early succession and regeneration stages. Areas may show signs of significant grazing, contain weeds or have been damaged by vehicle or machinery. Habitats are fragmented or have limited connectivity with other fauna habitats. Fauna assemblages in these areas are likely to differ significantly from what might be expected in the area had the disturbance not occurred.*

Highly degraded fauna habitat *– These areas often have a significant loss of vegetation, an abundance of weeds, and a large number of vehicle tracks or are completely cleared. Limited or no fauna habitat connectivity. Faunal assemblages in these areas are likely to be significantly different to what might have been in the area pre-disturbance.* (Coffey Environments, 2009).

The fauna habitat across the LPA is mostly Very Good for areas containing Very Good condition native vegetation with some Disturbed habitat along the cleared areas and tracks.

3.5.2 Fauna Species

Terrestrial vertebrate species listed in Table 2 are taken from Terrestrial Ecosystems' fauna survey database for surveys in the Rockingham and Mandurah areas. Terrestrial Ecosystems' fauna survey database includes records from the Atlas of Living Australia which includes records from the Western Australian Museum plus other vertebrate fauna surveys in nearby areas. Some of these species will occur in the project area, but because of the highly degraded nature of the area and the presence of feral cats and foxes, many of these species will not be present and those that are present are likely to be in low abundance.

Table 2: Vertebrate fauna caught in previous trapping programs in the region

Taxa	Family	Species	Common Name
Amphibians	Hylidae	*Litoria adelaidensis*	Slender Tree Frog
		Litoria moorei	Motorbike Frog
	Limnodynastidae	*Heleioporus eyrei*	Moaning Frog
		Limnodynastes dorsalis	Western Banjo Frog
	Myobatrachidae	*Crinia glauerti*	Glauert's Frog
		Crinia insignifera	Squelching Froglet
Reptiles	Agamidae	*Ctenophorus adelaidensis*	Western Heath Dragon
		Pogona minor	Dwarf Bearded Dragon
	Diplodactylidae	*Strophurus spinigerus*	South-western Spiny-tailed Gecko
	Elapidae	*Demansia psammophis*	Yellow-faced Whipsnake
		Elapognathus coronatus	Crowned Snake
		Neelaps calonotos	Black-striped Burrowing Snake
		Parasuta gouldii	Gould's Snake
		Pseudonaja affinis	Dugite
		Pseudonaja mengdeni	Gwardar
		Simoselaps bertholdi	Jan's Banded Snake
	Gekkonidae	*Christinus marmoratus*	Marbled Gecko

Appendix 9

Taxa	Family	Species	Common Name
		Gehyra variegata	Tree Dtella
	Pygopodidae	*Aprasia repens*	Sedgelands Worm-lizard
		Delma concinna	Javelin Lizard
		Delma fraseri	Fraser's Delma
		Delma grayii	Side-barred Delma
		Lialis burtonis	Burton's Snake-lizard
		Pletholax gracilis	Keeled Legless Lizard
		Pygopus lepidopodus	Common Scaly-foot
		Pygopus nigriceps	Western Hooded Scaly-foot
	Scincidae	*Acritoscincus trilineatus*	Western Three-lined Skink
		Cryptoblepharus buchananii	Buchanan's Snake-eyed Skink
		Ctenotus australis	Western Limestone Ctenotus
		Ctenotus fallens	West-coast Laterite Ctenotus
		Ctenotus gemmula	Jewelled South-west Skink
		Egernia napoleonis	South-western Crevice-skink
		Hemiergis initialis	South-western Earless Skink
		Hemiergis peronii	Lowlands Earless Skink
		Hemiergis quadrilineatum	Two-toed Earless Skink
		Lerista elegans	Elegant Slider
		Lerista lineata	Perth Slider
		Lerista praepedita	Blunt-tailed West-coast Slider
		Menetia greyii	Common Dwarf Skink
		Morethia lineoocellata	West Coast Morethia Skink
		Morethia obscura	Shrubland Morethia Skink
		Tiliqua occipitalis	Western Blue-tongued Lizard
		Tiliqua rugosa	Bobtail
	Typhlopidae	*Anilios australis*	Austral Blind Snake
	Varanidae	*Varanus gouldii*	Gould's Goanna
		Varanus tristis	Black-headed Monitor
Mammals	Canidae	*Vulpes*	Red Fox
	Felidae	*Felis catus*	House Cat
	Vespertilionidae	*Chalinolobus gouldii*	Gould's Wattled Bat
		Nyctophilus major	Greater Long-eared Bat
		Vespadelus regulus	Southern Forest Bat
	Dasyuridae	*Phascogale tapoatafa*	Brush-tailed Phascogale
	Macropodidae	*Macropus fuliginosus*	Western Grey Kangaroo
	Leporidae	*Oryctolagus cuniculus*	European Rabbit
	Peramelidae	*Isoodon fusciventer*	Quenda
	Muridae	*Hydromys chrysogaster*	Water Rat
		Mus musculus	House Mouse
		Rattus rattus	Black Rat

There are several pest species that may be present on the site outlined in Table 3.

Table 3: Feral and pest species likely to occur on the site

Taxa	Species Name	Common Name
Mammalia	*Vulpes vulpes*	Red fox
	Felis catus	Feral cat
	Oryctolagus cuniculus	European Rabbit
	Mus musculus	House Mouse
	Rattus rattus	Black Rat

Appendix A

3.5.3 Southern Brown Bandicoot

Quenda are listed as a Priority 4 species with the DBCA and are known to occur in the area. The Quenda was recently renamed and is now a species, *Isoodon fusciventer*¸ rather than a subspecies. Multiple Quenda have been relocated from areas adjacent to the LPA in earlier relocation programs.

Plate 5: Juvenile Quenda (photo source: Terrestrial Ecosystems)



Appendix 9

4 MANAGEMENT PLAN

4.1 Landscape Master Plan

The Landscape Masterplan for Lot 3 (9027) has been prepared by the developer and approved by the City of Rockingham (Appendix 5). The Landscape Master Plan includes the four LPA areas, adjoining areas of POS outside the LPA, and the City of Rockingham conservation reserve.

The approved Landscape Master Plan identifies the location of footpaths, rest spots, a 5m firebreak on the western interface, recreational facilities, areas that will require rehabilitation post construction of paths and drainage basins.

The Landscape Masterplan provides the construction design for this Management Plan. The construction of infrastructure and rehabilitation after construction of stabilising batters and retaining walls are not subject to this Management Plan.

This Management Plan largely focuses on the management of the LPAs however in some instances there is a cross over between the two plans, for example fencing and rehabilitation of native vegetation.

4.2 Objective

The objective of this LPA MP is to provide a framework of actions which are appropriate to manage, maintain and enhance the conservation values of the LPA. The LPA will also provide passive recreational and educational opportunities for the local residents.

The LPA MP will be successful when the LPA is ceded to the City of Rockingham and:

- The priority weeds in the LPAs are reduced;
- The native vegetation extent of the LPAs that require rehabilitation meets the completion criteria (note this does not include revegetation of batters as this comes under the Landscape Masterplan); and
- The overall condition of the LPA is maintained to its baseline levels surveyed in 2020, or better.

4.3 Timeframes

It is anticipated that the LPA will be under the control and responsibility of the City by practical completion of the adjacent subdivision.

Rehabilitation works (in accordance with the approved Landscape Master Plan V14) covering the degraded vegetation and provision of passive recreation infrastructure (paths, seating, lookout points, boardwalks) will be completed prior to the areas being ceded to the City.

4.4 Responsibilities

Ownership and management responsibilities of the LPA will remain with the landowner until they are ceded to the City.

Appendix 9

Management of the LPA sections will be handed over to the City as the development proceeds in line with the maintenance obligations agreed with the City.

4.5 Management Actions

The following management actions are largely relevant to the LPAs and the adjacent bushland POS. The stabilising batters and landscaped areas are not included as they are part of the Landscape scope of works. Figure 2 clearly identifies the areas that are relevant to this management plan.

4.5.1 Access

The more accessible parts of the LPAs will be used for passive recreational uses by the existing and future local residents. As a result, some of the existing tracks will be upgraded to shared pathways. The routes of the pedestrian/bicycle access pathways have been selected to have minimal impact on the remnant vegetation and landscape.

Access to some of the more fragile areas, particularly steep sections of the LPA will be discouraged. As a result, the South Western LPA and Mandurah Hill LPA are not proposed to have any formal public access into the bushland areas.

The Landscape Masterplan (Appendix 4) provides the approved design for paths, rest points, recreation equipment and educational signage will be constructed as part of the subdivision process to provide residents with passive recreation opportunities.

There will be no additional vegetation cleared in the LPAs other than what is noted within the detailed design drawings approved by the City of Rockingham. The LPAs and path locations will be surveyed and demarcated with bunting to ensure that clearing does not impact on the surrounding native vegetation.

Actions

The Landscape Masterplan is the guiding document for the design of the infrastructure in the LPAs, adjacent POS and the City's conservation POS.

The subdivision has been planned with a road and footpath adjacent to and outside of the LPAs and POS areas. No garden beds or turfed areas will be established directly adjacent to the LPAs without a hard surface providing separation along the interface.

The following actions will be implemented:

1. Implement the Landscape Masterplan as per Appendix 4.
2. Survey the LPAs, adjacent bushland POS and path locations and demarcate with bunting to prevent any inadvertent clearing.

3. Retain the vegetation in the LPAs and adjacent POS as shown in Figure 5 and manage for conservation. Within these areas, no clearing of trees or understorey will be permitted other than those approved by the City of Rockingham in the detailed design such as stabilisation works, paths, seating, lookout points and educational signage which where possible will be established on existing tracks.

Appendix 9

4.5.2 Habitat Rehabilitation

A vegetation and flora survey were undertaken in each of the LPA areas in spring 2020 to provide baseline information on the number of flora species present, identify key weed species and to set up long term monitoring quadrats (Appendix 5). The location of the eight quadrats is provided in Table 4.

The baseline vegetation and weed survey identified the areas in the LPAs and adjacent bushland POS that require weed control and rehabilitation. These areas are shown on Figure 5.

Table 4: Permanent Quadrat Locations

Quadrat Number	Easting	Northing
1	50 383848 E	6411647 N
2	50 383770 E	6411530 N
3	50 383692 E	6411552 N
4	50 383693 E	6411284 N
5	50 383673 E	6411225 N
6	50 384026 E	6411054 N
7	50 383752 E	6411036 N
8	50 383791 E	6411017 N

Species to be used in the rehabilitation works are provided in Table 5.

Table 5: Golden Bay LPA Bushland Rehabilitation Species List - Tubestock Mix B (Landscape Masterplan)

Species	Common Name
Acacia cochlearis	Rigid Wattle
Acacia cyclops	Coastal Wattle
Callitris preissii	Rottnest Island Pine
Eremophila glabra	Tar Bush
Ficinia nodosa	Knotted Club Rush
Lepidosperma gladiatum	Coast Sword Sedge
Leucophyta brownii	Cushion Bush
Leucopogon parviflorus	Coastal Beard Heath
Lomandra maritima	Lomandra
Myoporum insulare	Boobiala
Nitraria billardierei	Nitre Bush
Olearia axillaris	Native Rosemary
Rhagodia baccata	Seaberry Saltbush
Scaevola crassifolia	Thick Leaved Fan Flower
Spinifex hirsutus	Hairy Spinifex
Spyridium globulosum	Basket Bush
Templetonia retusa	Cockies Tongue
Tetragonia implexicoma	Bower Spinach

Appendix 9

The LPAs do not have any evidence of dieback. To protect the LPAs from dieback any additional soil brought into the development will be dieback free and vehicle and pedestrian access to the LPAs will be restricted and managed during construction to minimise the risk of introducing dieback or spreading the disease from areas that are infested via tyres and footwear and by eliminating the dumping of refuse and soil.

Individual species will be planted irregularly to reflect the distribution found in natural areas. Tubestock will be planted during late autumn to winter, following the first 100mL of rainfall, to allow maximum root growth and plant establishment before summer. If required, Tree guards will be erected around each plant to protect them from rabbit grazing.

Actions

4. Set up eight permanent quadrats based on the locations (Table 3) used in the baseline monitoring survey in 2020 in each area of the LPAs for annual vegetation/weed monitoring.
5. A qualified rehabilitation and revegetation contractor is engaged to undertake on-revegetation works in the areas identified in Figure 5.
6. Prepare revegetation site works plan, schedule and costs.
7. Collect seed for propagation (if required).
8. Undertake rehabilitation using the species provided in Table 2.
9. Tubestock will be sourced from accredited nurseries and planted according to the densities outlined within this report.
10. Planting of tubestock is the preferred method of revegetation.
11. Tubestock will be irregularly planted during late autumn to winter following the first 100mL of rainfall to allow maximum root growth and plant establishment before summer.
12. Follow standard dieback protocols.
13. The environmental consultant will monitor the permanent quadrats each year and progressively reduce the monitoring as each of the individual LPA's are handed to the City.

4.5.3 Weed Control

The baseline Flora and Vegetation survey undertaken in 2020 mapped the weeds in each of the LPAs as discussed in section 3 and mapped in Appendix 5.

One declared pest under the *Biosecurity Agricultural Management Act 2007* (BAM Act) *Gomphocarpus fruticosus* (Narrow-leafed Cottonbush) was recorded from a single location.

Appendix 9

Plate 7: *Gomphocarpus fruticosus* (Narrow-leafed Cottonbush) Source Florabase 2021



The Priority weeds mapped are:

- Geraldton Carnation Weed (*Euphorbia terracina*);
- Rose Pelargonium (*Pelargonium capitatum*);
- Branched Onion Weed *(Trachyandra divaricata*);
- Brazilian Pepper (*Schinus terebinthifolius*);
- Century Plant (*Agave americium*); and
- Geraldton Wax (*Chamelaucium uncinatum*).

The weed control program will be focussed towards eradicating the Declared and Priority weed species.

The Narrow-leafed Cotton Bush, Brazilian Pepper, Geraldton Wax and Century Plant have the greatest potential to invade other areas and compete with native species. These species should be removed as a high priority. The location of these weed species is recoded in Appendix 5.

Rose Pelargonium, Geraldton Carnation Weed and Branched Onion Weed occur in each of the LPAs. Although Geraldton Carnation Weed is not a Declared Weed it is increasingly invasive in the Swan Natural Resource Management (NRM) Region. These three weeds are considered to be Priority species and therefore will be targeted in a control program while still managing other weed species.

Initial weed control will be implemented prior to planting of tubestock. The recommended methods and optimum timing for controlling specific weed species present on the site is outlined in Table 6.

To minimise soil erosion brush-wood will be utilised if necessary if weed eradication results in areas of bare sand.

Management Actions

14. The weed control program will increase resources to eradicate the Priority species as outlined in Table 6.
15. A suitably qualified weed contractor will need to be engaged to carry out the weed management and they will need to be familiar with the herbicide use in the City of Rockingham conservation areas.
16. The landscape maintenance contractor will undertake quarterly visual assessment of the listed priority weeds in the LPAs and inform the project Environmental Consultants.
17. Based on the visual assessment weed management including spot spraying and hand weeding will be undertaken as required by landscape maintenance contractor.
18. Based on the visual assessment the mulch or brushing will be topped up to control weed growth and sand drift by the landscape maintenance contractor.
19. The environmental consultant will undertake weed monitoring during the annual vegetation monitoring program in the LPAs.

Appendix 9

Table 6: Optimum Weed Control and Timing for the Specific Weed Species on the Site

Species	Methods	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Declared Species													
Narrow Leafed Cotton Bush (*Gomphocarpus fruticosus)*	*Hand pull small plants, ensuring removal of as much root material as possible. Hand removing plants with mature fruits can lead to release and rapid spread of wind dispersed seed. Foliar spray with 1.5% glyphosate or try cut and paint using 50% glyphosate. Read the manufacturers' labels and material safety data sheets before using herbicides.	X	X	X	X	X	X	X	X	X	X	X	X
Priority Species													
Geraldton Carnation Weed (*Euphorbia terracina*)	Logran® at 12.5g/100L + the penetrant Pulse ®						x	x	x				
Rose Pelargonium (*Pelargonium capitatum)*	Spray metsulfuron methyl 5 g/ha + Pulse®						x	x	x	x	x		
Branched Onion Weed (*Trachyandra divaricata)*	Spray 0.4g chlorosulfuron + 25mL wetting agent in 10L of water or manual removal of small infestations.						x	x	x				
Century Plant *(Agave americana)*	*Dig out and/or hand remove small infestations. Stem inject into base of leaves 1 part Tordon®/5 parts diesel. Read the manufacturers' labels and material safety data sheets before using herbicides..	x	x	x	x	x	x	x	x	x	x	x	x
Other Weed Species													
Cape Weed (*Arctotheca calendula)*	Chip out small infestations, ensuring root is severed well below ground level to prevent re-sprouting from the crown. For large infestations apply Lontrel® 6 ml/10 L (300 ml/ha) or spray glyphosate at 10 ml/L.						x	x	x	x	x	x	
Hottentot Fig (*Carpobrotus edulis)*	Manual methods are most effective. Remove all roots and stem fragments and follow up with removal of any germinating plants or spray with glyphosate at 2% + surfactant.						x	x	x	x	x		

Appendix 9

Couch Grass (*Cynodon dactylon)*	Spray Fusilade® Forte at 13 ml/L + wetting agent or for generic fluazifop-p (212g/L active ingredient) 8mL/L + wetting agent or 1% glyphosate. Almost always requires follow-up treatment.	x	x									x	x
African Lovegrass (*Eragrostis curvula)*	Spray with 1-2% glyphosate or cut out small infestations. Always requires follow-up treatment.	x	x	x	x	x						x	x
Perennial Veldt Grass (*Ehrharta calycina*)	Spray with Fusilade® Forte 13 ml/L or 6.5 L/ha + wetting agent. Follow-up in subsequent years. For small infestations, cut out plants ensuring crown removal. Do not slash.						x	x	x				
Treasure Flower *(Gazania linearis)*	^Spray with 50mL glyphosate (450g/L) in 10 L water. In bushland areas use 4g of Lontrel®750 + 25 mL Pulse® in 10 L water to reduce damage to companion plants. 200 g/ha of Lontrel®750 + 0.25% wetting agent can be used for roadside and overall spraying.			x	x	x				x	x	x	
Beach Evening Primrose (*Oenothera drummondii)*	Control in seedling stage, as older plants resistant to herbicide. Relatively resistant to glyphosate. Hand remove small populations in areas not susceptible to erosion. Spot spray chlorsulfuron 0.4 g/10 L + spray oil.							x	x	x	x		

- Sourced from Florabase (DPaW, 2015) and also *Sydney Weeds Committees, 2012; ^HerbiGuide Pty Ltd, 2014
- Note: This table indicates the optimum timing to implement weed control for specific species, indicating the months that control would achieve the best results for that species. This table may be used as a guide for determining timing of weed control at the site.

Appendix 9

4.5.4 Fauna Management

Quenda (*Isoodon fusciventer)* will be managed in accordance with the Ministerial Statement 297. If any areas of native vegetation are required to be cleared to implement the Landscape Masterplan a Quenda relocation program will be carried out by the project zoologist. The Quenda trapping program will pick up other fauna such as reptiles all of which will be relocated. Any cats trapped during the program will be checked for microchips and delivered to the cat haven for collection by their owner. Any feral cats will be euthanised humanely.

20. Undertake Quenda relocation program as required for any areas identified to be cleared in accordance with the Landscape Masterplan.

21. If an injured wildlife is encountered, the nominated carer or Wildlife Hotline shall be called to rescue the animal.

4.5.5 Feral Fauna Management

Rabbits are highly likely to pose a threat to revegetation success by grazing on the planted tubestock. The proximity of the site to residential housing restricts the use of chemical control and due to the size of the site and density of vegetation exclusion via construction of a rabbit-proof fence is not a viable option. Therefore, revegetation works will consist of tubestock as opposed to seeding which would leave the seedlings vulnerable and exposed. If required, tree guards will be installed if rabbit grazing is limiting tubestock survival.

Management Actions

22. Install tree guards when required to protect tubestock from grazing.
23. Check tree guards during monthly weed inspection and replace where required.
24. Remove tree guards when vegetation has established.

25. Dispose of food waste into covered waste facilities to ensure that feral or other animals are not attracted to the site.

4.5.6 Fencing

Farm style fencing (as approved by the City) is being installed on a staged basis in areas as shown in Figure 5. The fencing is to be constructed to the City's requirements as shown in at Appendix 6. The fence will be 1.2m high with four strand post and wire.

Management Actions

26. Construct fencing around the LPAs and POS as shown in Figure 5 prior to handover to the City.

4.5.7 Firebreak

A firebreak will be maintained on the current alignment on the western side of the bushland POS (see Attachment 4). The City and DFES require the firebreak to have compacted crushed limestone surface along the length of the firebreak and that two four wheel drive vehicles can pass at approximately 200m intervals.

Any other firebreaks will be constructed in accordance with the Bushfire Management Plan.

Appendix 9

Management Actions

27. Upgrade the existing fire break along the western Bushland POS interface as shown in Attachment 4.

4.5.8 Post Construction

The LPAs and adjacent Bushland POS will require maintenance post construction until the sections are handed to the City. Educational signage will be installed to inform the residents on the environmental values associated with the LPA.

ACTIONS

28. Site maintenance to be carried out. This will include maintenance of tree guards and perimeter fence, weed management and rabbit control as required.
29. Install educational signage that clearly states that access is restricted to defined pathways, fauna/flora interpretation and importance of domestic animal control and include a contact number to report any dumping or inappropriate activity.

Appendix 9

Table 7: Management Actions Summary

Topic	Action		Timing	Responsibility
Access				
	1	Implement the Landscape Masterplan as per Appendix 4.	Pre-construction	Developer
	2	Survey the LPAs, adjacent bushland POS and path locations and demarcate with bunting to prevent any inadvertent clearing.	During Construction	Developer
	3	Retain the vegetation in the LPAs and adjacent POS as shown in Figure 5 and manage for conservation. Within these areas, no clearing of trees or understorey will be permitted other than those approved in the Landscape Masterplan such as stabilisation works, paths, seating, lookout points and educational signage which where possible will be established on existing tracks.	Pre-construction	Developer
Habitat Rehabilitation				
	4	Set up eight permanent quadrats based on the locations (Table 3) used in the baseline monitoring survey in 2020 in each area of the LPAs for annual vegetation/weed monitoring.	Pre-construction	Environmental Consultant
	5	Contract a qualified rehabilitation and revegetation contractor to undertake on-ground planning and revegetation works in the areas identified in Figure 5.	Pre-construction	Environmental Consultant
	6	Prepare revegetation site works plan, schedule and costs.	Pre-construction	Environmental Consultant
	7	Collect seed for propagation (if required).	Pre- construction	Environmental Consultant
	8	Undertake rehabilitation using the species provided in Table 2.	Pre-construction	Rehabilitation Contractor
	9	Tubestock will be sourced from accredited nurseries and planted according to the densities outlined within this report.	Construction	Rehabilitation Contractor
	10	Planting of tubestock is preferred method of planting.	Construction	Rehabilitation Contractor

Appendix 9

Topic	Action		Timing	Responsibility
	11	Tubestock will be irregularly planted during late autumn to winter following the first 100mL of rainfall to allow maximum root growth and plant establishment before summer.	Construction	Rehabilitation Contractor
	12	Follow standard dieback protocols.	Construction	Rehabilitation Contractor
	13	The environmental consultant will commence monitoring the permanent quadrats one year from planting to ensure completion criteria are met. Monitoring will continue until the LPAs are handed to the City.	Ongoing	Environmental Consultant
Weed Control				
	14	The weed control program will increase resources to eradicate the Priority species as outlined in Table 6.	During construction	Environmental Consultant/Site Manager
	15	A suitably qualified weed contractor will need to be engaged to carry out the weed management and they will need to be familiar with the herbicide use in the City of Rockingham conservation areas.	Pre-construction	Site Manager
	16	The landscape maintenance contractor will undertake monthly visual assessment of the listed priority weeds in the LPAs and inform the project Environmental Consultants.	During Construction	Site Manager
	17	Based on the visual assessment weed management including spot spraying and hand weeding will be undertaken as required by landscape maintenance contractor.	During Construction	Site Manager
	18	Based on the visual assessment the mulch or brushing will be topped up to control weed growth and sand drift by the landscape maintenance contractor.	During Construction	Site Manager
	19	The environmental consultant will undertake weed monitoring during the annual vegetation monitoring program in the LPAs.	During Construction	Environmental Consultant
Fauna Management				

Appendix 9

Topic	Action		Timing	Responsibility
	20	Undertake Quenda relocation program as required for any areas identified to be cleared in accordance with the Landscape Masterplan.	Post construction	Rehabilitation Contractor
	21	If an injured wildlife is encountered, the nominated carer or Wildlife Hotline shall be called to rescue the animal.	Post construction	Developer
Feral Fauna Management				
	22	If required, install tree guards when required to protect tubestock from grazing.	During construction	Environmental Consultant/Rehabilitation Contractor
	23	Check tree guards during monthly weed inspection and replace where required.	Pre-construction	Site Manager
	24	Remove tree guards when vegetation has established.	During Construction	Site Manager
	25	Dispose of food waste into covered waste facilities to ensure that feral or other animals are not attracted to the site.	During Construction	Site Manager
Fencing				
	26	Construct fencing around the LPAs and POS as shown in Figure 5 prior to handover to the City.	Post Construction	Site Manager
Firebreak				
	27	Upgrade the existing fire break along the western Bushland POS interface as shown in Attachment 4.	During Construction	Site Manager
Post Construction				
	28	Site maintenance to be carried out. This will include maintenance of tree guards and perimeter fence, weed management and rabbit control as required.	Post Construction	Rehabilitation Contractor
	29	Install educational signage that clearly states that access is restricted to defined pathways, fauna/flora interpretation and importance of domestic animal control and include a contact number to report any dumping or inappropriate activity.	Post Construction	Rehabilitation Contractor

Appendix 9

4.6 Monitoring

Table 8 details the monitoring program for rehabilitation works in the LPA and adjacent Bushland areas. It consists of a program of:

- Vegetation and weed monitoring; and
- Inspection of bushland rehabilitation within the LPA.

For the vegetation monitoring, the eight 10m x 10m quadrats established in the baseline flora, vegetation and weed survey (PGV Environmental, 2020) will be monitored. These will be surveyed annually in late September/early October (mid-Spring) for tree health, species richness, percentage cover of natives, and percentage cover of weeds.

The annual monitoring in the LPA sections commenced in Spring 2023.

Monitoring effort will progressively decrease as the LPA sections are handed to the City of Rockingham.

Table 8: Monitoring Program

Parameter	Purpose	Location	Frequency	Responsibility
Species richness, percentage cover and plant health within monitoring quadrats	To monitor condition of LPAs and Adjacent Bushland POS following clearing of surrounding vegetation.	Eight permanent quadrats have been set up in the LPAs and Adjacent Bushland POS	Annually, in LPA and Adjacent Bushland POS until handed to the City of Rockingham	Environmental Consultant
Percentage cover of weeds in quadrats.	To identify any new infestations of significant weeds.	Eight permanent quadrats within LPAs and Adjacent Bushland POS.	Annually, in LPA and Adjacent Bushland POS until handed to the City of Rockingham	Environmental Consultant
Emergence of seedlings in rehabilitated areas.	To determine success of rehabilitation	Rehabilitation areas within the POS conservation areas	Annually, in LPA and Adjacent Bushland POS until handed to the City of Rockingham	Rehabilitation Contractor
Occurrence of weeds in landscaped areas	To establish need for weed control as required	Rehabilitation areas within the LPAs and Adjacent Bushland POS	Annually, in LPA and Adjacent Bushland POS until handed to the City of Rockingham	Rehabilitation Contractor

Appendix 9

4.7 Targets and Performance Indicators

A number of environmental targets, based on the management objective, have been developed for the management of the LPAs and adjacent Bushland POS. Performance indicators have also been developed for use in assessing the achievement of these targets (Table 9).

Table 9: Management Plan Targets and Performance Indicators

Objective	Target	Performance Indicator
The objective of this LPA MP is to provide a framework of actions which are appropriate to manage, maintain and enhance the native vegetation in the LPA. The LPA will also provide passive recreational and educational opportunities for the local residents.	No clearing or disturbance within the LPA other than that approved by the City through the detailed design plans and Civil Design for the development interface.	No evidence of unauthorised clearing activities within the LPAs and Adjacent Bushland POS No evidence of unauthorised access to LPAs and Adjacent Bushland POS.
	Permanent fencing installed post development to the standard required by the City of Rockingham.	Post development check of permanent fencing.
	No decline in the number of species, percentage cover and condition of vegetation within the LPAs and Adjacent Bushland POS	Results of annual vegetation monitoring quadrats in the LPAs and Adjacent Bushland POS.
	At least 75% survival of planted tubestock within each revegetation area	Results of annual vegetation monitoring quadrats in the LPAs and Adjacent Bushland POS
	No invasive Century Plant or Narrow-leafed Cottonbush within the LPAs and Adjacent Bushland POS	Results of annual weed monitoring in the LPAs and Adjacent Bushland POS.
	Significant reduction of other Priority weeds the LPAs and Adjacent Bushland POS	Results of annual weed monitoring in the LPAs and Adjacent Bushland POS.

Appendix 9

4.8 Contingencies

The following contingency measures will be put in place if monitoring indicates that management measures have not been effective and/or targets are not being achieved (Table 9).

Table 9: Contingency Measures

Trigger	Action		Responsibility
Significant decrease in species richness, percentage cover or plant health within the eight monitoring quadrats.	1	Investigate cause	Environmental Manager
	2	Undertake remediation works	Rehabilitation Contractor
	3	Plant additional tubestock.	Rehabilitation Contractor
Poor emergence/survival in	1	Undertake top-up broadcast-seeding and/or infill planting with seedlings.	Rehabilitation Contractor

rehabilitated areas in LPAs and Adjacent Bushland POS.			
Significant increase in percentage covers of invasive weed density in monitoring quadrats	1	Investigate cause	Environmental Manager
	2	Implement measures to prevent further weed infestations and carry out weed control activities as required	Rehabilitation Contractor
Weed infestation in rehabilitated areas	1	Investigate cause	Environmental Manager
	2	Implement measures to prevent further infestation (e.g. weed control, screening to stop airborne weed vectors)	Rehabilitation Contractor
Impacts form uncontrolled pedestrian access	1	Investigate cause	Environmental Manager
	2	Implement access controls and install additional signage.	Rehabilitation Contractor

4.9 Implementation Schedule

Rehabilitation within the LPAS and adjacent Bushland POS will be undertaken through a staged approach in parallel with the development stages of Lot 3 and implementation of the Landscape Masterplan.

Indicative timeframes for construction work are as follows:

- Stage5G – construction Jan 22 to Jun 22;
- Stage 5F – construction Dec 22 to Jun 23;
- Stage 5E – Sep 23 to Mar 24;
- Stage 5H -Jan 24 to Jul 24; and
- Stage 5I – Jun24 to Dec24.

The rehabilitation works will be staged similarly to the construction timeframes.

4.10 Reporting

Implementation status and monitoring results for this management plan will be provided in an annual report provided to the City of Rockingham in March each year until the LPAs and Bushland POS are handed to the City.

Appendix 9

5 REFERENCES

Brown, K., Cullity, J., Paczkowska, G. and Bettink, K. (2013) Managing Geraldton carnation weed (*Plate*), in the woodlands, wetlands and heathlands of the Swan Coastal Plain. Department of Environment and Conservation Government of Western Australia, Perth

Department of Environment and Conservation (DEC) (2011) Standard Operating Procedure Techniques for mapping weed distribution and cover in bushland and wetlands Government of Western Australia, Perth

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Government of Western Australia (2000) Bush Forever - Keeping the Bush in the City. Volume 2: Directory of Bush Forever Sites. Perth, Western Australia.

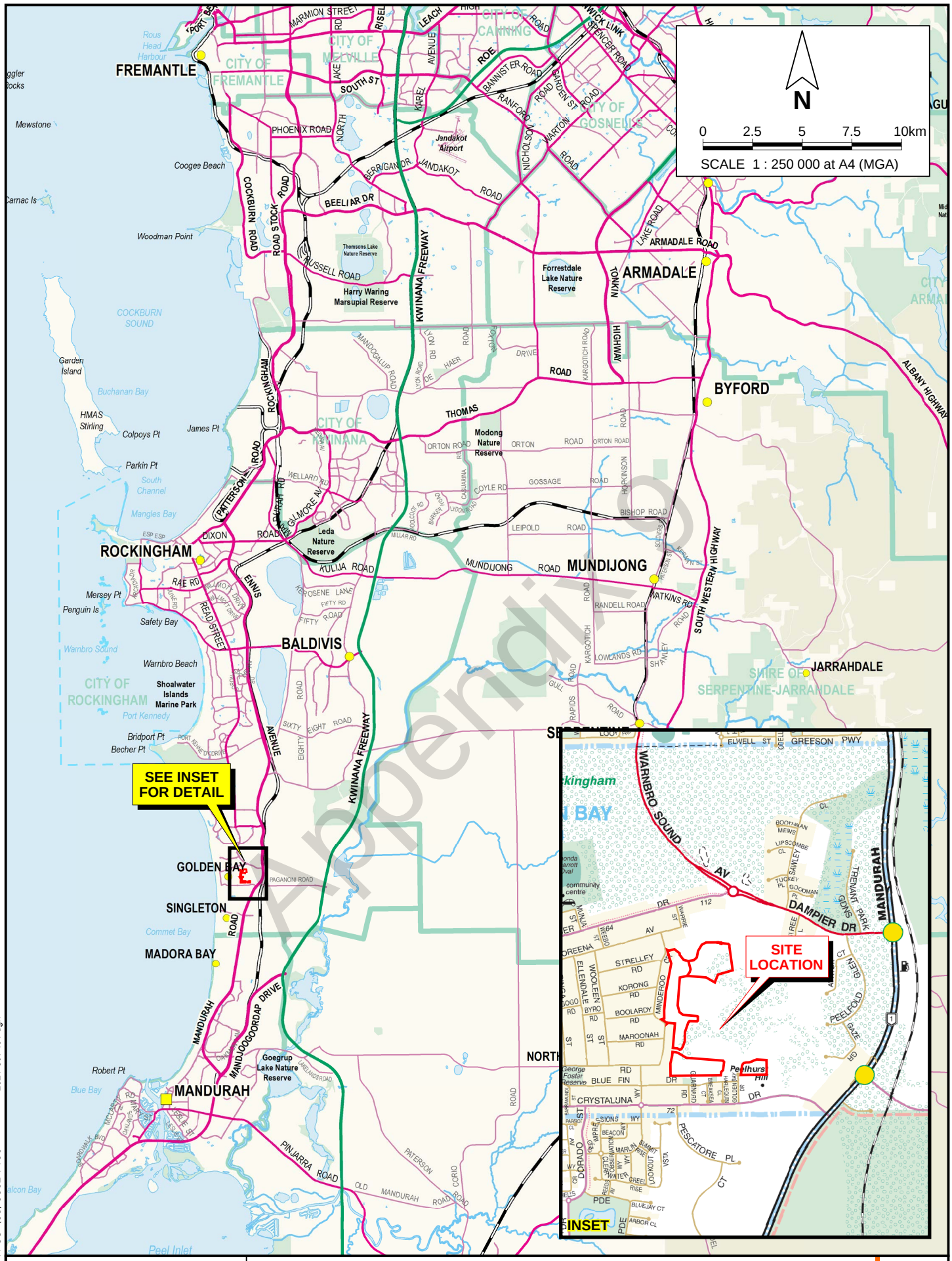
Heddle, E.M., Loneragan, O.W. and Havel, J.J. (1980) Vegetation complexes of the Darling System, Western Australia. In Atlas of Natural Resources of the Darling System of Western Australia. Department of Conservation and Environment. Perth, Western Australia.

PGV Environmental (2020). Baseline Landscape Protection Area Baseline Flora, Vegetation and Weed Survey – Golden Bay.

Appendix 9

FIGURES

Appendix 9



PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-597-f01.dgn

pgv ENVIRONMENTAL

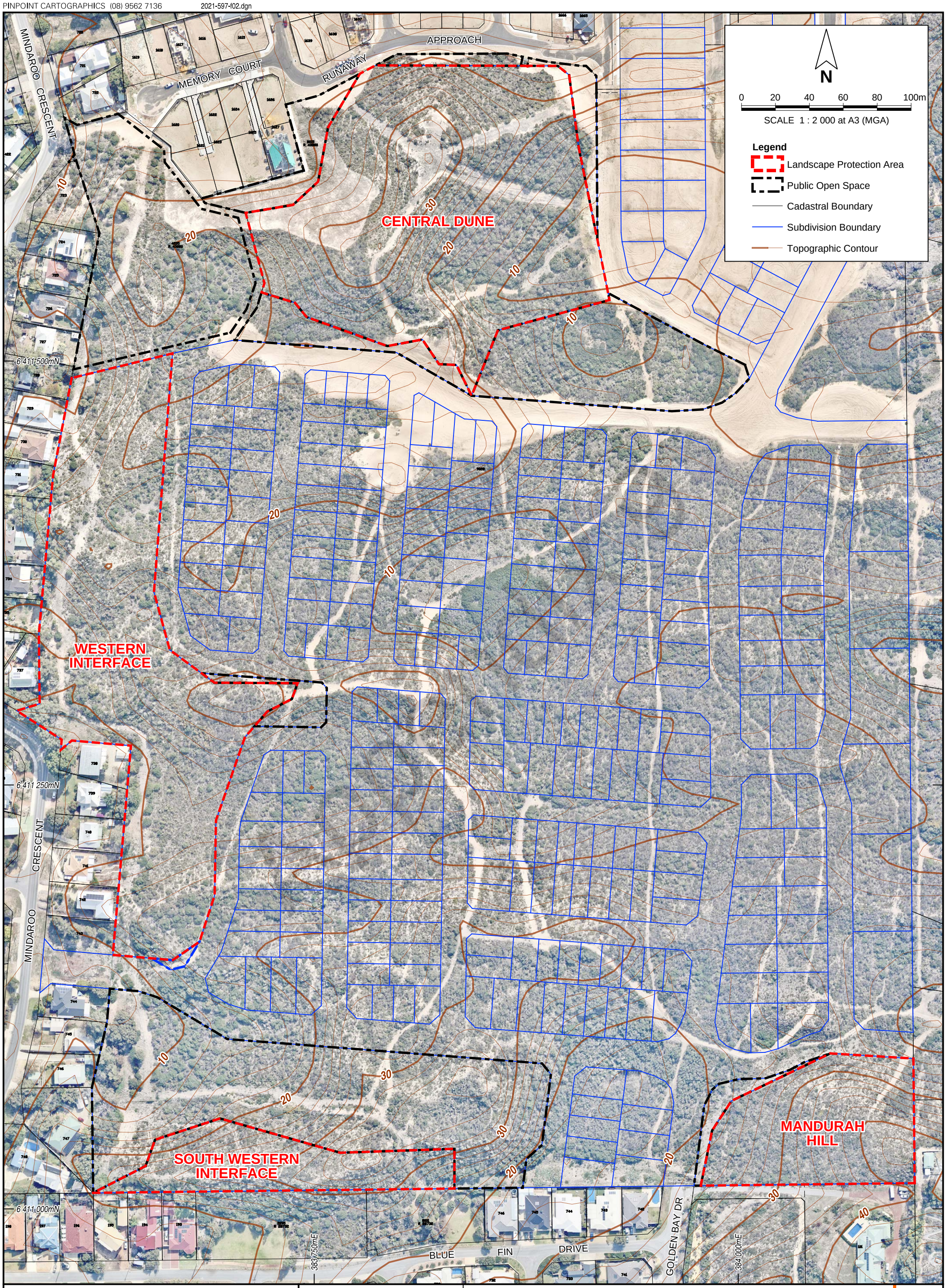
Peet Golden Bay Pty Ltd
GOLDEN BAY LANDSCAPE PROTECTION AREA MANAGEMENT PLAN
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: B. Heath	Date: 7 Sep 2021
Job: 10004 Rpt: 2021-597	Revision: A

SITE LOCATION

Figure 1

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-597-f02.dgn



CADASTRAL SOURCE: Landgate, August 2020.
CONTOURS SOURCE: Dept. of Agriculture, 2000.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: EPCAD, Lot 3 Landscape Mater Plan, 06-07-20.

pgv ENVIRONMENTAL

Drawn: B. Heath | Date: 7 Sep 2021
Job: 10004 Rpt: 2021-597 | Revision: A

Peet Golden Bay Pty Ltd
GOLDEN BAY LANDSCAPE PROTECTION AREA MANAGEMENT PLAN
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

LANDSCAPE PROTECTION AREAS AND TOPOGRAPHY

Figure 2

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-597-f03.dgn

MINDAROO CRESCENT
MEMORY COURT
RUNAWAY
APPROACH
GB1
CENTRAL DUNE
GB3
GB2
6 411 500mN
WESTERN INTERFACE
GB4
6 411 250mN
GB5
MINDAROO CRESCENT
SOUTH WESTERN INTERFACE
GB7
GB8
6 411 000mN
383 750mE
BLUE FIN DRIVE
GOLDEN BAY DR
384 000mE
GB6
MANDURAH HILL

N

0 20 40 60 80 100m

SCALE 1 : 2 000 at A3 (MGA)

Legend

- Landscape Protection Area
- Public Open Space
- Cadastral Boundary
- Subdivision Boundary
- Quadrat Location
- Vegetation Type Boundary

Vegetation Types

- **ArMsAl** *Acacia rostellifera/Melaleuca systena/ Acacia lasiocarpa* Open Low Heath
- **ArSg** *Acacia rostellifera/Spyridium globulosum* Open to Closed Heath
- **SaMsAl** *Santalum acuminatum/ Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath
- Batter Slope Revegetation
- Exotic Planting
- Cleared Area

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: EPCAD, Lot 3 Landscape Mater Plan, 06-07-20.

pgv ENVIRONMENTAL

Drawn: B. Heath | Date: 5 Apr 2021

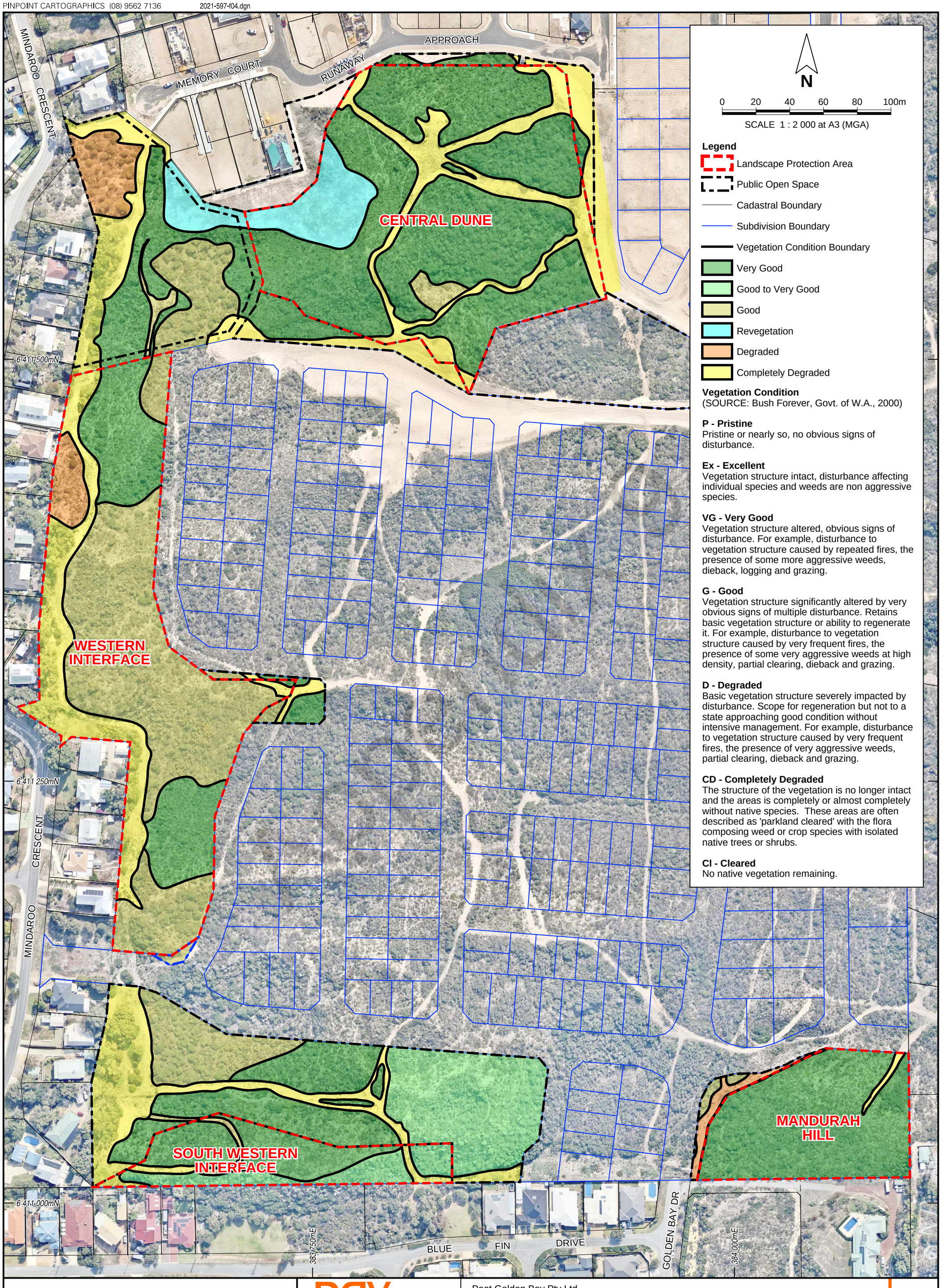
Job: 10004 Rpt: 2021-597 | Revision: A

Peet Golden Bay Pty Ltd
GOLDEN BAY LANDSCAPE PROTECTION AREA MANAGEMENT PLAN
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

VEGETATION TYPES

Figure 3

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-597-f04.dgn



N

0 20 40 60 80 100m

SCALE 1 : 2 000 at A3 (MGA)

Legend

- Landscape Protection Area
- Public Open Space
- Cadastral Boundary
- Subdivision Boundary
- Vegetation Condition Boundary
- Very Good
- Good to Very Good
- Good
- Revegetation
- Degraded
- Completely Degraded

Vegetation Condition
(SOURCE: Bush Forever, Govt. of W.A., 2000)

P - Pristine
Pristine or nearly so, no obvious signs of disturbance.

Ex - Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

VG - Very Good
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G - Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D - Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD - Completely Degraded
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

Cl - Cleared
No native vegetation remaining.

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

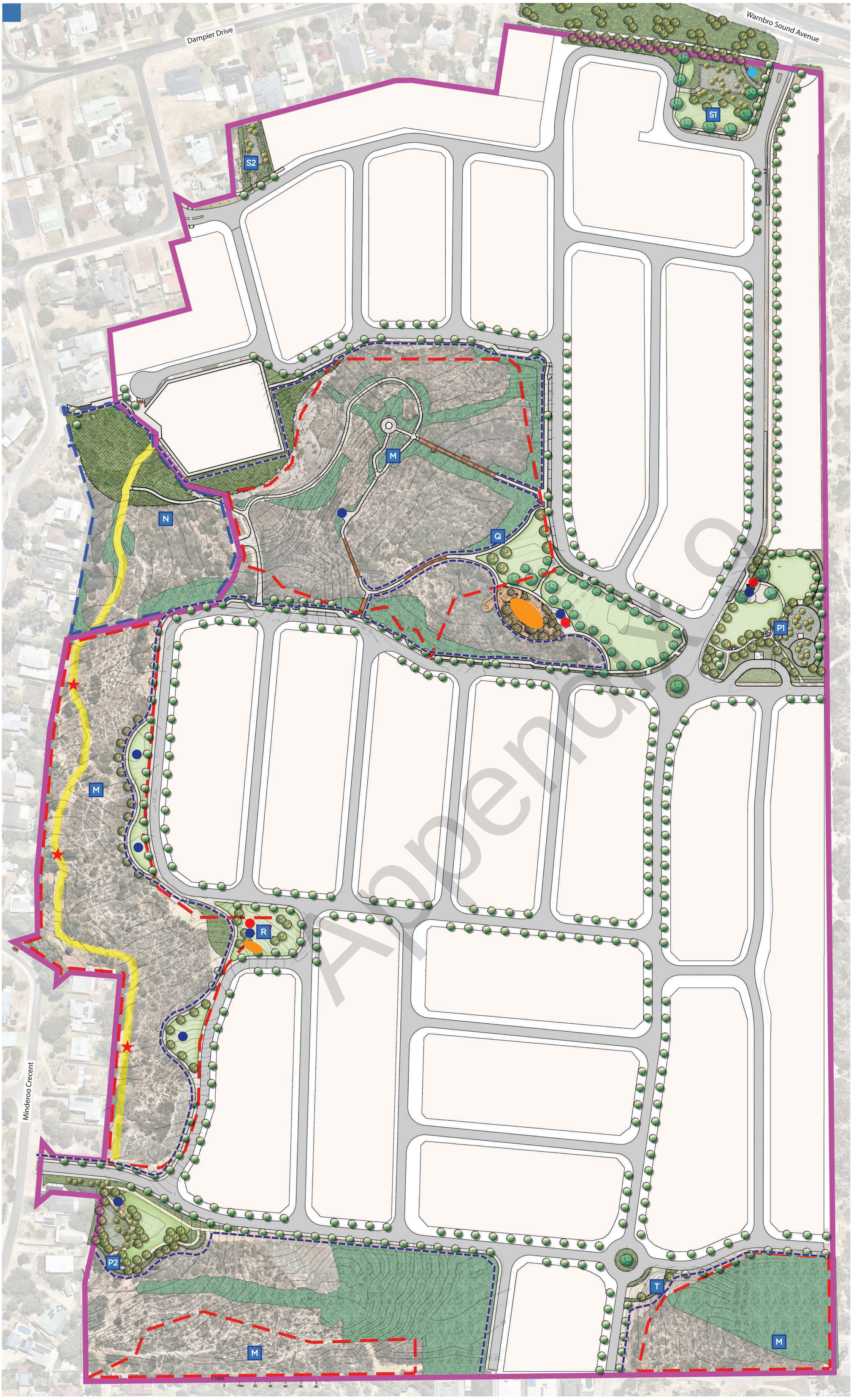
pgv ENVIRONMENTAL

Drawn: B. Heath | Date: 7 Sep 2021
Job: 10004 Rpt: 2021-597 | Revision: A

Peet Golden Bay Pty Ltd
GOLDEN BAY LANDSCAPE PROTECTION AREA MANAGEMENT PLAN
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

VEGETATION CONDITION

Figure 4



Legend:

- Extent of Local Structure Plan
- Shrubs
- Drainage swale with littoral tubestock
- **Roll on turf**
- Footpath
- Low fire fuel vegetation
- Terraced retaining wall
- Rehabilitation planting
- Existing coastal bush
- City of Rockingham conservation reserve
- Landscape protection area
- Entry statement
- Shade structure
- Bench seating / Picnic setting
- Play area
- Compacted crushed limestone fire access with run-off bunds and vehicular passing points
- Vehicle access gate
- Conservation fencing

LANDSCAPE PROTECTION AREAS 'M'

Located throughout the proposed Lot 3 development, the landscape protection areas are highlighted as areas to be protected and retained and the proposed landscape design is not dissimilar to the original approved Open Space and Landscape Structure (1994). The four separate sites have been recognized as significant natural features and the landscape design is heavily focused around the retention of the dunal formation. With the integration of interpretive signage, viewing deck, pedestrian walkways and strategically placed shade elements, the landscape protection areas will provide active and passive recreation to both future and existing residents.

The focus on keeping as many proposed footpaths along existing tracks is imperative and by providing walk trails and circular routes, walking, jogging and cycling is encouraged. Degraded areas shall be rehabilitated or landscaped appropriately to suit the existing features.

Clearing and earth working along lot boundaries and road edges is required.

Fire management will be an important component of the design and ongoing maintenance of this public open space.

CONSERVATION RESERVE 'N'

Adjoining two landscape protection areas 'M' and the existing residential subdivision, this conservation reserve has been highlighted for retention due to the significant natural dunal features. Minor landscape works are proposed with formalized footpaths installed and rehabilitation works to degraded areas. Fire management will be an important component of the design and ongoing maintenance of this conservation reserve. Footpaths and installation of low plants at the designated planting density as per the document Plant Guide within the Building Protection Zone for the Swan Coastal Plain of Western Australia work as a low fuel area. PEET will maintain the site as per the attached conditions, for the lifetime of the project with the City to assume control of the site after this time and continue the required maintenance.

PLANT SPECIES	
LOW FUEL TUBESTOCK MIX	**BPZ separation distance**
Conostylis candicans	Height 0.4 m, APZ spacing 1.2 m
Carpobrotus virescens	Height 0.8 m, APZ spacing 2.4m
Eremophila glabra (groundcover)	Height 0.4 m, APZ spacing 1.2 m
Kennedia prostrata	Prostrate shrub, creeper
Myoporum parvifolium	Height 0.08 m, APZ spacing 0.24 m
Suaeda australis	Height up to 0.9 m, APZ spacing 2.7 m
Threlkeldia diffusa	Height 0.4 – 1 m, APZ spacing 1.2 – 3 m
Westringea dampieri	Height 0.64 m, APZ spacing 1.92 m

DRAINAGE BASINS 'P1 & P2'

The public open space areas allocated as P1 and P2 are landscaped drainage basins that hold a large volume of storm water. However they also provide passive and visual amenity. All drainage basins are walled with some balustraded for safety if required. Footpaths, seating and signage feature throughout ensuring that these POS areas are useable and enhance the estate from a visual perspective. Where the drainage basins abut lots, screen tree and shrub planting are proposed to respect privacy and prevent access.

NEIGHBOURHOOD PARK 'Q'

Centrally located within the Lot 3 development, this neighbourhood park provides active and passive recreation facilities similar to POS 'T' within lot 2. The proposal details a grassed kick-about area over existing degraded land that encourages active play within this part of the development.

Shade trees surround the grassed area, with 2 formal shade structures at either side with barbecue and picnic facilities.

A nature play area nestles at the base of the existing dune with play for all ages and a set of steps lead up to the central lookout at the top of the hill.

NEIGHBOURHOOD PARK 'R'

This public open space is adjoined to one of the landscape protection areas 'M' and as such acts as a transition between active formalized open space and the retained and protected dunal landform. This POS may feature amenities such as open grassed kick-about areas, circular footpath walks, a shade structure with seating, swing set and formalized tree and shrub planting.

LANDSCAPE SPACE 'S1& S2'

The strategically placed spaces S1 and S2 will be restricted use drainage basins or landscaped entry statements of a high aesthetic nature. Due to the site constraints these additional areas allocated purely for drainage assist with the encouragement of infiltration of storm water at source. Planted with water wise species of shrubs, littoral plants and trees, the vegetation will assist with nutrient stripping, water absorption and midge and mosquito control.

LANDSCAPE SPACE 'T'

This space will be a passive landscaped area that acts as a buffer to the landscape protection areas 'M'. All other landscaping will be predominantly soft works with supplementing tree, shrub or rehabilitation planting to the dunal formations to provide a fluent landscape space. These areas will be primarily for passive recreation and provide a visually aesthetic outlook from proposed lots with a formal landscaped area and a backdrop of the large retained landscape and rehabilitation planting beyond.

Appeal

epcad.com.au

GOLDEN BAY Lot 3: Landscape Master Plan Version 16

0 10 20 50
SCALE: METRES

N

scale : NTS @ A1 date : 1st July 2024

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☎+61 8 9481 4410 ✉epcad@epcad.com.au

EPCAD

APPENDIX 1

Appendix 9

Ass # 604

Bull # 648

State # 297

WESTERN AUSTRALIA
MINISTER FOR THE ENVIRONMENT

STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED (PURSUANT TO THE PROVISIONS OF THE ENVIRONMENTAL PROTECTION ACT 1986)

URBAN DEVELOPMENT OF PART LOT 12 & RESERVE 34664 (AFFECTING PART OF SYSTEM SIX RECOMMENDATION M107), GOLDEN BAY (604)

H & B DEVELOPMENTS PTY LTD

This proposal may be implemented subject to the following conditions:

1 **Proponent Commitments**
The proponent has made a number of environmental management commitments in order to protect the environment.

1-1 In implementing the proposal, the proponent shall fulfil the commitments (which are not inconsistent with the conditions or procedures contained in this statement) made in the Consultative Environmental Review and included in Environmental Protection Authority Bulletin 648. (A copy of the commitments is attached.)

2 **Implementation**
Changes to the proposal which are not substantial may be carried out with the approval of the Minister for the Environment.

2-1 Subject to these conditions, the manner of detailed implementation of the proposal shall conform in substance with that set out in any designs, specifications, plans or other technical material submitted by the proponent to the Environmental Protection Authority with the proposal. Where, in the course of that detailed implementation, the proponent seeks to change those designs, specifications, plans or other technical material in any way that the Minister for the Environment determines on the advice of the Environmental Protection Authority, is not substantial, those changes may be effected.

3 **Foreshore Reserve**

3-1 The proponent shall provide a foreshore reserve for conservation and recreation which:

1 protects the Peelhurst wetlands and the Southern Brown Bandicoot (*Isoodon obesulus*) population; and
2 includes landscape and recreation values at least equivalent to the area affected by this proposal which is within System 6 Recommendation M107 Area.

3-2 Prior to the lifting of Urban Deferment, the proponent shall identify the foreshore reserve as required by condition 3-1, and at subdivision the proponent shall transfer to public ownership the proposed foreshore reserve, to the requirements of the Minister for the Environment on advice of the Environmental Protection Authority.

Published on
12 JAN 1993

18th FLOOR, ALLENDALE SQUARE, 77 ST GEORGE'S TERRACE, PERTH, W.A. 6000 TELEPHONE 325 9422 FAX 325 5621

Appendix 1

4 **Landscape Protection**
The landscape value of the parabolic dune ridge on the eastern edge of Golden Bay should be recognised.

4-1 Prior to subdivision approval, the proponent shall liaise with the Department of Planning and Urban Development and the City of Rockingham to incorporate planning measures which recognise and protect the landscape value of the parabolic dune ridge on the eastern edge of Golden Bay, to the requirements of the Minister for the Environment and the Minister for Planning on advice of the Department of Planning and Urban Development, the City of Rockingham and the Environmental Protection Authority.

5 **Southern Brown Bandicoot (*Isoodon obesulus*)**
The population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay requires special consideration.

5-1 Prior to the commencement of development and in consultation with the Department of Conservation and Land Management, the proponent shall establish the regional implications of disturbing the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay and shall initiate management of the population, to the requirements of the Minister for the Environment on advice of the Department of Conservation and Land Management.

5-2 The proponent shall carry out the on-going management of the population of the Southern Brown Bandicoot (*Isoodon obesulus*) at Golden Bay to the requirements of the Department of Conservation and Land Management.

6 **Proponent**
These conditions legally apply to the nominated proponent.

6-1 No transfer of ownership, control or management of the project which would give rise to a need for the replacement of the proponent shall take place until the Minister for the Environment has advised the proponent that approval has been given for the nomination of a replacement proponent. Any request for the exercise of that power of the Minister shall be accompanied by a copy of this statement endorsed with an undertaking by the proposed replacement proponent to carry out the project in accordance with the conditions and procedures set out in the statement.

7 **Time Limit on Approval**
The environmental approval for the proposal is limited.

7-1 If the proponent has not substantially commenced the project within five years of the date of this statement, then the approval to implement the proposal as granted in this statement shall lapse and be void. The Minister for the Environment shall determine any question as to whether the project has been substantially commenced. Any application to extend the period of five years referred to in this condition shall be made before the expiration of that period, to the Minister for the Environment by way of a request for a change in the condition under Section 46 of the Environmental Protection Act. (On expiration of the five year period, further consideration of the proposal can only occur following a new referral to the Environmental Protection Authority.)

8 **Compliance Auditing**
In order to ensure that environmental conditions and commitments are met, an audit system is required.

Appendix 1

ATTACHMENT 2

8-1 The proponent shall prepare periodic "Progress and Compliance Reports", to help verify the environmental performance of this project, in consultation with the Environmental Protection Authority.

Procedure

The Environmental Protection Authority is responsible for verifying compliance with the conditions contained in this statement, with the exception of conditions stating that the proponent shall meet the requirements of either the Minister for the Environment or any other government agency.

If the Environmental Protection Authority, other government agency or proponent is in dispute concerning compliance with the conditions contained in this statement, that dispute will be determined by the Minister for the Environment.

Jim McGinty, MLA
MINISTER FOR THE ENVIRONMENT

12 JAN 1999

Appendix 1

ATTACHMENT 2

PROPONENT'S COMMITMENTS

URBAN DEVELOPMENT OF PART LOT 12 & RESERVE 34664 (AFFECTING PART OF SYSTEM SIX RECOMMENDATION M107) GOLDEN BAY (604)

H & B DEVELOPMENTS PTY LTD

The proponent has made the following environmental commitments:

Appendix 1

ATTACHMENT 2

CONSOLIDATED LIST OF COMMITMENTS FOR GOLDEN BAY

1. The proponent will provide, in exchange for the development of the currently proposed System 6 Area M107, additional Regional and Public Open Space adjacent to the Coastal Reserve as shown in the Structure Plan, in excess to that which would normally be required by DPUD. This will be done to the satisfaction of the EPA, DPUD and the Local Authority at the rezoning stage.

2. The proponent will prepare a Management Plan for the Coastal Reserve at Golden Bay prior to development commencing. This will be done to the satisfaction of DPUD and the Local Authority.

3. The proponent will include an historic aboriginal camping site within the proposed Public Open Space for the development. This will be done to the satisfaction of the Local Authority.

4. The proponent will continue to provide and maintain a network of firebreaks and access tracks to protect against bushfire until the Local Authority takes on this responsibility. This will be done to the satisfaction of the Local Authority.

5. The proponent will provide reticulated sewerage and will design the development so that stormwater drainage is disposed of on site. This will be done during the installation of services within the development to the satisfaction of DPUD and the Local Authority.

6. The proponent will liaise with CALM regarding the presence of bandicoots at Golden Bay and if required by CALM will examine the feasibility of relocating the bandicoots to an appropriate location elsewhere. This will be done prior to any disturbance of the vegetation at Golden Bay and will be done to the satisfaction of both CALM and the EPA.

Appendix 1

APPENDIX 2

Appendix 9

ATTACHMENT 3

6

WESTERN AUSTRALIA

MINISTER FOR THE ENVIRONMENT

CITY OF ROCKINGHAM
Officer: Jc
Copy: Planner
File: TP1-3-1-13
Date: 1 NOV 1993
Action:
Reply:
Record:

Our Ref: ENV934818

Town Clerk
City of Rockingham
PO Box 42
ROCKINGHAM WA

25 NOV 1993

CLEARANCE OF ENVIRONMENTAL CONDITION 4-1 PERTAINING TO THE URBAN DEVELOPMENT OF PART LOT 12 AND RESERVE 34664, GOLDEN BAY

Having examined the matter carefully and assessed the arguments put forward by the Consultative Committee which consisted of representatives of the Department of Planning and Urban Development, the City of Rockingham, the Environmental Protection Authority and the Golden Bay Progress Association, the Minister for Planning and myself are in agreement on the requirements to clear Condition 4-1 as outlined below.

The area presented for protection of the landscape features, identified on Plan 2 as the "Area of Agreement" is acceptable and the land identified on Plan 2 as the "Area of disagreement" is suitable for residential development and need not be protected for landscape features.

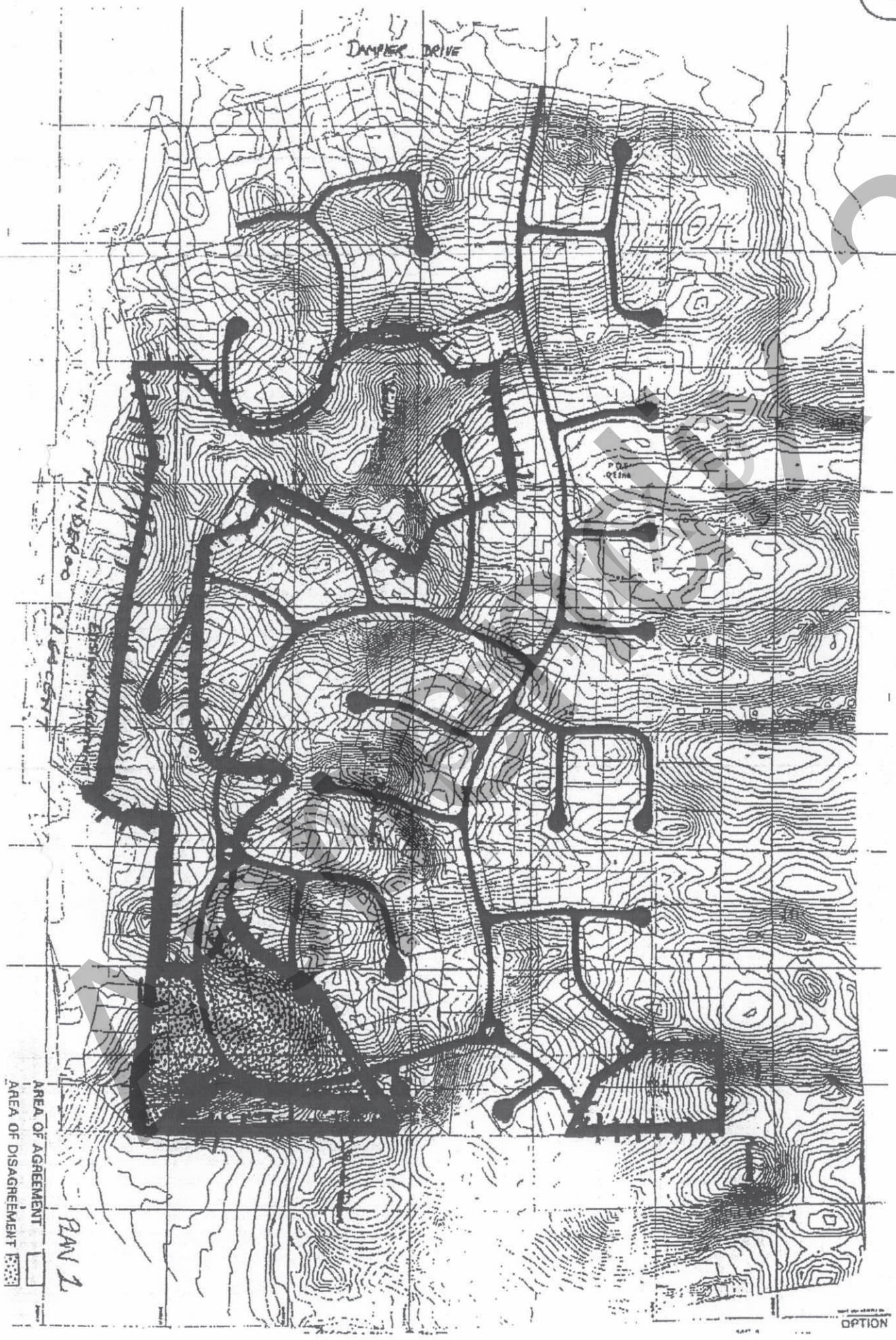
These requirements should now be implemented through the final stages of zoning, subdivision and design.

Kevin Minson MLA
MINISTER FOR THE ENVIRONMENT

Appendix 2

12th FLOOR, DUMAS HOUSE, 2 HAVELOCK STREET, WEST PERTH, 6005 TELEPHONE (09) 321 2222 FAX (09) 322 5149

ATTACHMENT 3



APPENDIX 3

Appendix 9

ATTACHMENT 7

26

CITY OF ROCKINGHAM

Civic Boulevard, Rockingham,
Western Australia

OUR REF: 28/2794 & 94569 PM:slr
YOUR REF:

ENQUIRIES TO: Mr Monks

21st December 1994

Mr P Goff
Mitchell Goff & Associates
28 Mayfair Street
WEST PERTH WA 6005

Dear Sir

Re: Proposed Landscape Protection Area Management Plan - Pt Lot 12 Dampier Drive, Golden Bay

I refer to your application dated 9 September 1994 concerning the above proposal and advise that it was considered by Council at its ordinary Meeting held on 20th December 1994.

Council resolved that you be advised that it generally supports the proposed Management Plan for the Landscape Protection Area at Pt Lot 12 Dampier Drive, Golden Bay, subject to the following conditions:

1. Detailed plans for the proposal indicating finished ground levels, heights of retaining walls, fencing types and location, access path location, viewing deck details, rehabilitation of 'blow out' areas and landscaping details shall be submitted to Council in the form of a separate development application for approval prior to any works commencing.

2. Two additional access paths shall be provided from Minderoo Crescent to the Western Interface Reserve and one additional access path shall be provided from the recreation area at the base of Mandurah Hill to the path proposed by Council on the Mandurah Hill reserve itself.

3. The extent of the clearing on the eastern face of the 37m Central Dune shall be determined on-site at the time that the subdivision works are progressing in order to get a clearer understanding of the implications of the proposal.

4. The works undertaken in the landscape protection area shall be maintained by the developer to the satisfaction of the Council for a period of three years from the time the works were undertaken.

.../2

Appendix 3

25

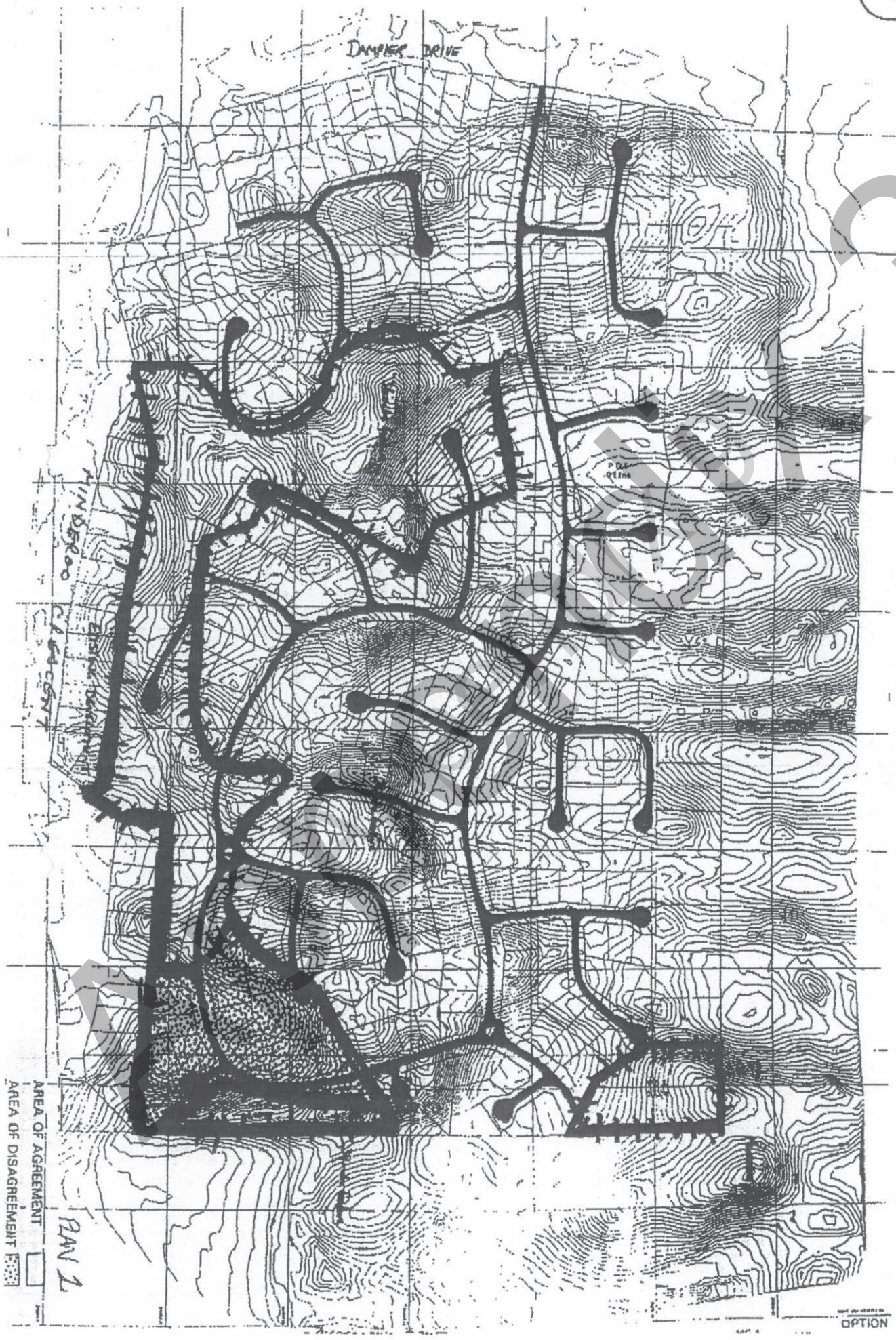
Should you have any enquiries with respect to this advice please do not hesitate to contact Mr Peter Monks on 528 0330.

Yours faithfully

G G HOLLAND
CHIEF EXECUTIVE OFFICER

Appendix 3

ATTACHMENT 3



GOLDEN BAY LANDSCAPE PROTECTION MANAGEMENT PLAN

For

H & B DEVELOPMENTS PTY LTD

November 1994

Prepared by

MITCHELL GOFF & ASSOCIATES

Appendix 3

1. INTRODUCTION

2. THE COMPREHENSIVE DEVELOPMENT PLAN

3. MANAGEMENT OBJECTIVES

4. EXISTING STATE

5. THE STRATEGY

5.1 THE RETAINED CENTRAL DUNE

5.2 THE WESTERN INTERFACE

5.3 THE MANDURAH HILL AREA

5.4 THE SOUTHERN BOUNDARY

5.5 THE SUBDIVISION STREETSCAPE

FIGURES:

1. Retained Dunes and Landscape Reserve

2. Landform Integration

3. Open Space and Landscape Structure

APPENDICES:

1. List of Proposed Species for Revegetation/Consolidation.

2. List of Proposed Species for General Landscape works.

3. Schedule of Commitments for Public Open Space.

Appendix 3

ATTACHMENT 7

03

1. INTRODUCTION

This report describes the approach being adopted for the retention and management of those areas of the site which constitute protected 'landscape features'.

The Ministerial condition placed upon the rezoning/subdivision of Golden Bay, for the "protection of the landscape features" seeks to conserve the landscape character of the area and specifically the height of certain dune formations.

Those areas of dunes to be retained are shown on Figure 1.

The strategy adopted to comply with the conditions, is to have an overall landscape plan addressing constraints and opportunities of the site.

The strategy has arisen from our analysis of the site and discussion with both the City of Rockingham Planning and Landscape Officers and also the Progress Association. The approach that is illustrated by the concept landscape master plan fully addresses the Ministerial condition for the "protection of the landscape features". The landscape proposals also comply with the City of Rockingham's Landscape Policy for New Subdivisions.

2. THE COMPREHENSIVE DEVELOPMENT PLAN

The Comprehensive Development Plan (CDP) was approved by the City of Rockingham Council on 23rd August 1994, subject to a number of conditions, four of which are addressed by this document. Condition 2, 3, 4 and 7 related to the protection of landscape features, their identification on site and the requirement for the preparation of management plans.

The CDP illustrated the general approach to the retention of features and the integration of such features into the development plans for the area.

Appendix 3

ATTACHMENT 7

5. THE STRATEGY

The incorporation of substantial landforms and their associated vegetation into the development requires two main issues to be addressed:

i) the physical retention
ii) the management of access and use

These two issues are related in so far as by their retention, the landforms become a focus for recreation and in turn their well being must be provided for by the management of access.

i) Physical Retention

In retaining the dunes, substantial level changes occur between lots, roads and landform. On the central dune, south of Noreena Avenue, the change of level is quite extreme and without manipulation of the lower slopes creates a potentially inhospitable and incongruous situation.

It is proposed that modification of the lower section of the dune is undertaken so that the landform relates more closely to the adjacent roads. This reduces the need for retaining structures and allows for controlled and limited access for passive recreational purposes. See Figure 2.

The positioning of retaining structures away from the road edge allows the rising landform to be graded in such a manner as not to present a prohibitive face to neighbouring areas.

The reserves to the south and west of the site do not have the same problems of retention and level juxtaposition.

ii) Management of Access and Use

The retained dunes are a focus for recreation and therefore are liable to suffer from erosion through pedestrian traffic. The central high dune is most likely to suffer more than other areas due to its location and being surrounded by residential blocks.

Appendix 3

It will be important therefore to manage access to the dune and control the way people use the area. It is proposed that the lower slopes are modified to allow public access and by doing so, encourage use to one particular area in the form of a small park.

The peak of the dune is a goal for walkers and it is proposed that routes are identified and 'way marked'. The peak itself can be protected by the incorporation of a small viewing deck to prevent destabilisation of the high point. Pathways would be low key incorporating log steps and 'kick rails' to encourage users to stay on track. The further definition of routes through the planting of scrub vegetation, Tuart and Tea trees in selected locations aids in stabilisation and integration with the surrounding areas.

The dunes forming the western boundary with the existing settlement will be retained as they exist with limited planting to reinforce the existing vegetation, help define the reserve's eastern boundary and to clarify limited access routes. Traffic regulation devices such as raised kerbs and bollards will be used to prevent vehicles accessing the area direct from the adjacent road.

The two southernmost reserves are very steep inclines and will be retained as coastal heath with supplementary planting to the lower edges. An area will be created on the lowest slopes which will be predominantly grass allowing local incidental play space. Access to the remaining areas will be discouraged by the use of dwarf rail fencing to the heath edge.

The plan is illustrated in Figure 3.

The proposals fall into five categories:

- the retained Central Dune
- the Western Interface Reserve
- the Mandurah Hill area
- the South Western face
- the Subdivision Streetscape

Appendix 3

5.1 The retained Central Dune

The retained Central Dune forms the highest point on the development rising to 37 metres. The dune forms part of the public open space reserve amounting to 6.272 hectares, which also runs north-south down the western boundary of the site.

The dune forms a dominating focal point in the area and is a feature which will become an attraction to local residents due to the potential lookout from its summit. Changes of levels between roadways and the edge of the dune up to 6 metres have the potential to visually separate this feature from the surrounding development.

The approach therefore has been to modify the lower slopes of the dune reducing the need to create potentially unsightly engineered structures. See Figure 2.

Such modification also allows for public access and use to be managed to focused areas thus relieving pressure on the "natural" areas of the dune. It is proposed that as well as creating local maintained areas around the base of this feature, access paths will be designed to take people to the summit and along desire lines. These paths will be sited to minimise disruption to the dune vegetation and located in such a manner as to deter access to other dune areas. The plan therefore promotes an enhanced landscape around the base, offering local passive recreation facilities and managed access to the summit.

On completion of the landscape works, this area will form two distinct yet related zones; the lower terraced park and the upper dune and summit.

The lower terraced park will incorporate limestone block walling, grassed areas, tree planting for shade and low key park facilities such as play equipment and seating. Planting in this area will utilise a mix of species tolerant of the site conditions which will also complement the retained coastal heath.

Appendix 3

The upper dune and summit will incorporate low timber posts and rails, decking to the summit, fencing to prevent access and localised new planting of coastal heath species. Additionally, footpaths will be identified by way mark posts and the path itself stabilised. Stabilisation will take numerous forms including timber steps, crushed limestone surface with bituminous emulsion and localised timber decking. Where required, the dune will be stabilised with pegged brush and limited seeding or planting of indigenous species to localised areas in need of rehabilitation.

5.2 The Western Interface Reserve

This stretch of land linked to the main dune, runs north-south between existing development and the proposed new subdivision.

The proposal in this area is to retain the area as it presently exists with only minor manipulation of its edges where they front onto the new subdivision. Such minor modifications are in the form of landscape enhancement where limited strategic use of indigenous planting will reinforce the existing vegetation, and screen and manage particular views. It is also proposed to manage the vegetation to allow access to areas but deterring free access throughout this zone. The selective thinning of vegetation to allow access will be carried out in consultation with the Council. The routes will be planned to ensure that privacy to adjacent blocks is preserved. Access will be managed using timber post and rail fencing to key locations in association with 'way mark' posts.

5.3 The Mandurah Hill Area

On the south-eastern corner of the site lies an area of bush which forms the lower dune formation to the Mandurah Hill. This .79 hectare public open space will be treated in a similar fashion to the retained Central Dune. It is proposed that the area is generally retained and conserved as it exists, but that a zone close to the new road system is designed to accommodate local low key passive recreation. New plantings of indigenous trees and shrubs will be used to articulate space and provide a setting for local play facilities. The remaining areas will have a level of reinstatement planting to reinforce existing vegetation and provide a more robust edge treatment where public access is to be deterred. In all the dune reserves, fencing will be sensitively incorporated to manage access.

Appendix 3

5.4 The Southern Boundary

This severely sloping dune area will be fenced off around its base with timber post, rail and wire. The area is unlikely to tolerate access of any nature and its retention will be for visual amenity purposes only. It may be appropriate to further reinforce the edges of the reserve with dense shrub material which is complementary to the heath vegetation. This will help prohibit access.

5.5 The Subdivision Streetscape

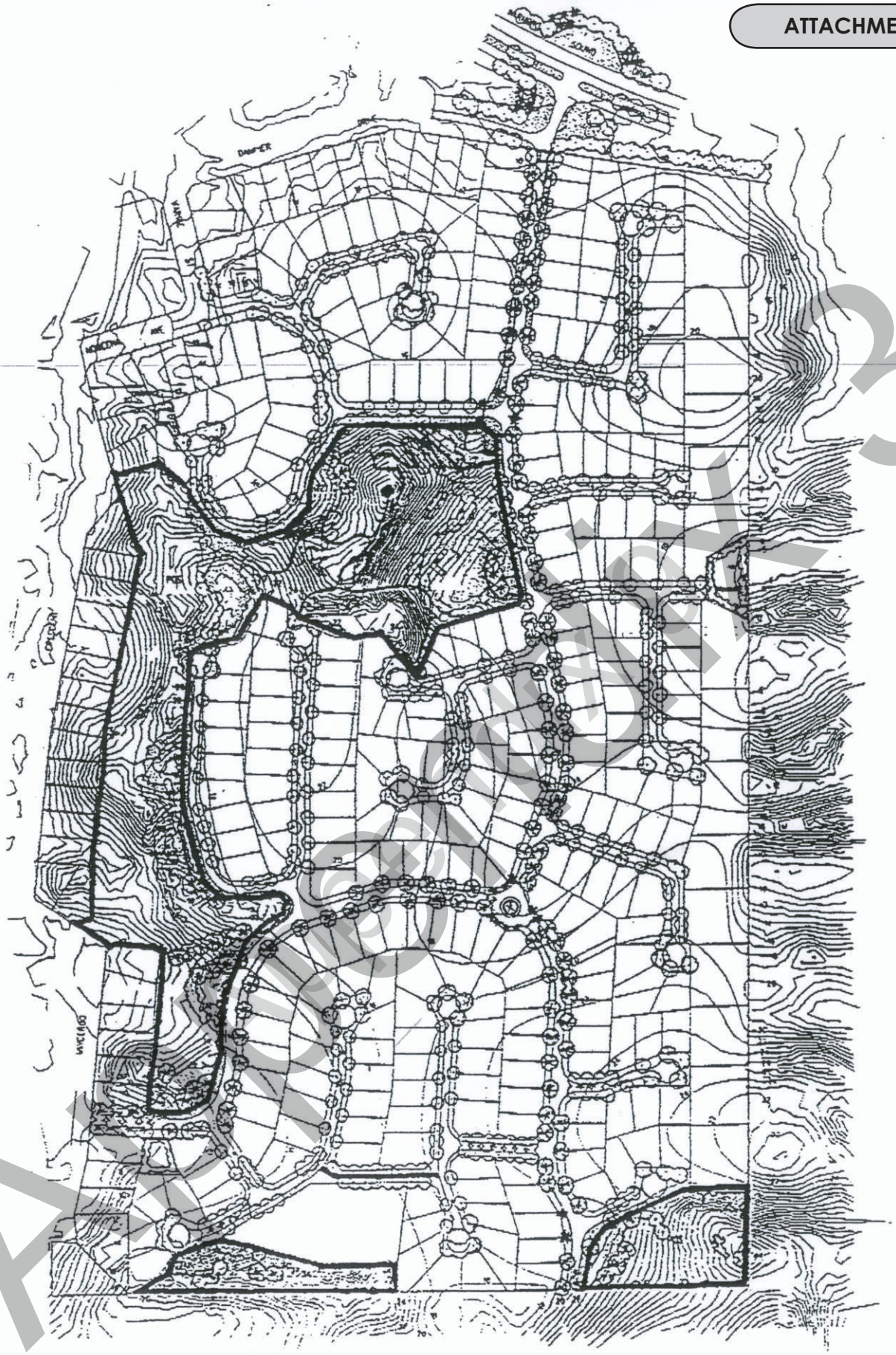
The retention and enhancement of key landscape features on the site must be seen as an integral part of an overall approach to the landscape design of the area. The design of the neighbourhood incorporates landscape framework of street tree planting. The street trees will play an important part in the integration of residential development in the area.

Street trees will include nature species such as:

Agonis flexuosa
Eucalyptus maculata
Casuarina equiestifolia
Introduced species which are characteristic of the area such as Araucaria, will also be incorporated extending the existing character of neighbouring areas.

Appendix 3

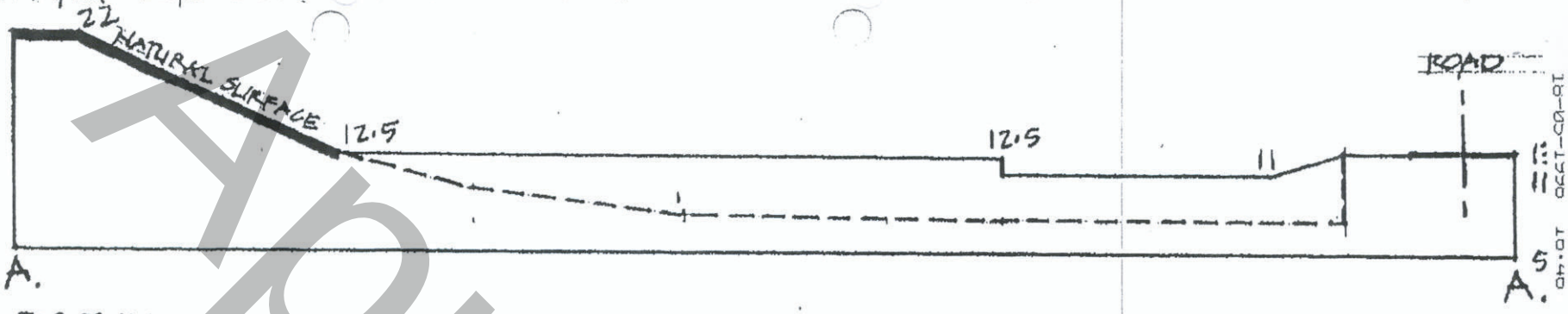
ATTACHMENT 7



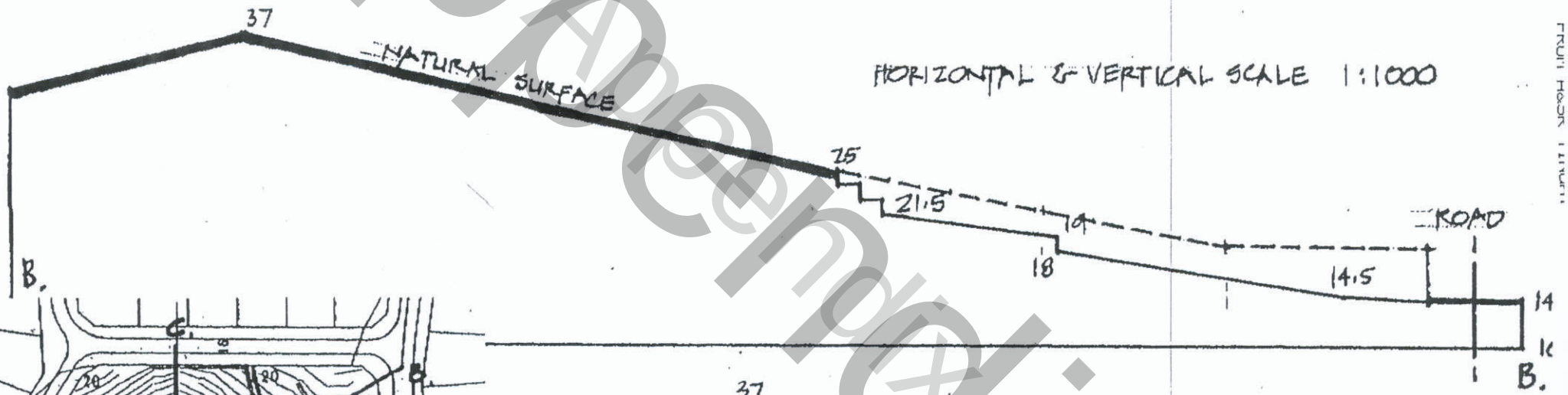
OPEN SPACE AND LANDSCAPE STRUCTURE
GOLDEN BAY
FOR H AND B DEVELOPMENTS PTY LTD

ATTACHMENT 3

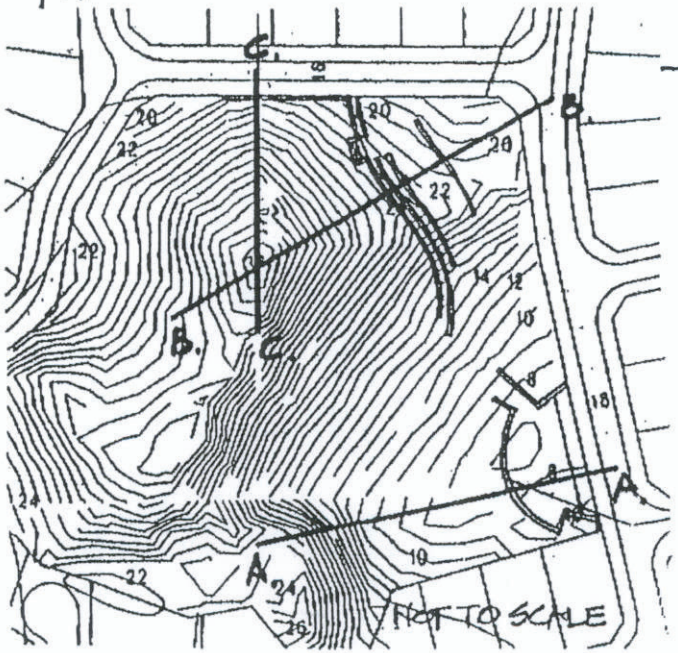
Appendix 3

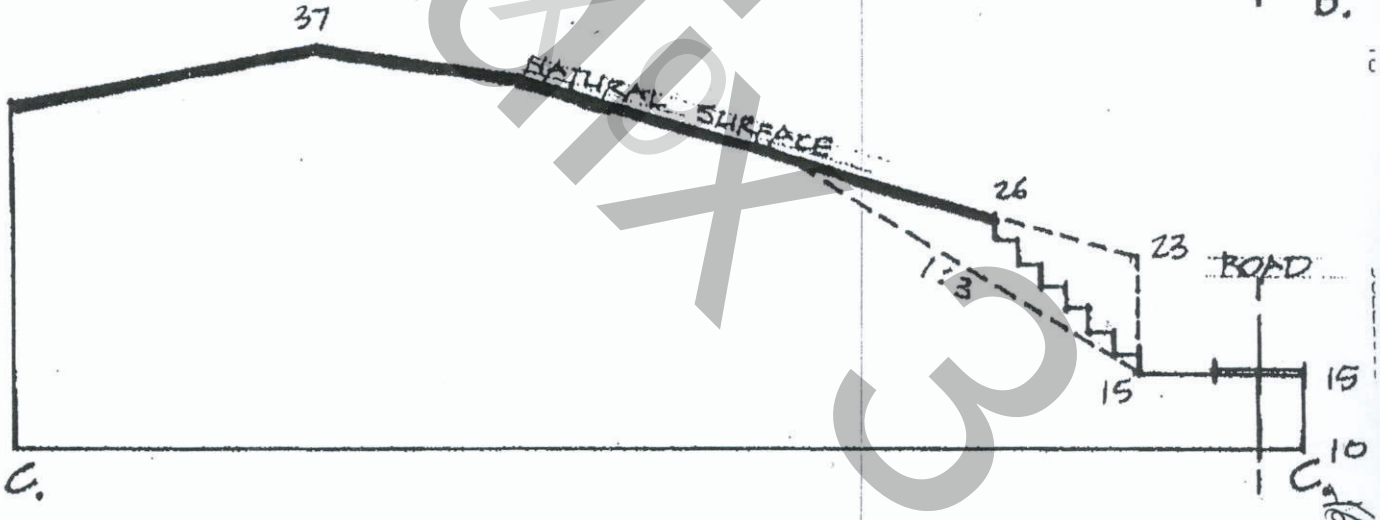


TOP OF HILL



HORIZONTAL & VERTICAL SCALE 1:1000





LANDFORM INTEGRATION : SECTION

ATTACHMENT 7

ATTACHMENT 7

COPY



SCALE 1:500

OPEN SPACE AND LANDSCAPE STRUCTURE
GOLDEN BAY
FOR H AND B DEVELOPMENTS PTY LTD

Planning and Environmental Consultants

22 September 1994

APPENDIX 3

APPENDIX 4

Appendix 9

Our Ref: LUP/1469-11 - AD21/19346

Your Ref: Golden Bay Estate, Central POS - Landscape Approval Letter

Enquiries to: Ms N Watkinson - 9527 0742

city of Rockingham

where the coast comes to life

24th February 2021

Mr Tiago Martins
EPCAD Pty Ltd
28-30 Mayfair Street
WEST PERTH WA 6872

Dear Mr Martins

Re: Golden Bay Estate Lot 3 – Central/Landscape Protection Public Open Space (POS), Elvina Vista and Runaway Approach, Golden Bay, Landscape Approval Letter

The City of Rockingham approves in principle the landscape / development proposal for Golden Bay Estate Central POS design in accordance with:

Landscape Drawings (CoR Ref: D21/27168):

- B0740/GB/ST5CP/L101-L106 Rev B
- B0740/GB/ST5CP/L201-L203 Rev B
- B0740/GB/ST5CP/L204-L206 Rev A
- B0740/GB/ST5CP/L207-L209 Rev B
- B0740/GB/ST5CP/L215 Rev A
- B0740/GB/ST5CP/L301-L303 Rev A
- B0740/GB/ST5CP/L210-L211
- B0740/GB/ST5CP/L212 Rev B
- B0740/GB/ST5CP/L213-L214
- B0740/GB/ST5CP/L216-217
- B0740/GB/ST5CP/L400-406

Irrigation Drawings (CoR Ref: D21/20264):

- 18172-01 to 18172-05 Date 4/02/21

The approval is given subject to the following issues being addressed to the satisfaction of the City of Rockingham:

General

1. Prior to commencement of on-ground works the applicant must forward the successful contractors certificates of currency for Public Liability.

2. It is the responsibility of the applicant to co-ordinate with all other consultants/contractors involved in the development works covered under this approval. The applicant is responsible for liaising with architects, civil and hydrologic engineers, electricians, irrigation consultants during the design and construction process to ensure that the landscape works are consistent with the various disciplines to create a holistic outcome. If the delivery of the work is divided between various contractors (Landscape and Civil Contractors), it remains the applicants responsibility to oversee the outcome and update where required to meet the conditions of the Landscape approval. Importantly, being cognisant of existing site conditions, proposed and/or retained overland flow paths, including function of bio filtration swales or conveyance requirements.

Appendix 4

Failure to accommodate required levels to kerbs, footpaths, pavements, structures may require modification prior to handover.

3. All required Building Licences and Structural Engineer Certifications must be obtained for all structures including:

   - All retaining walls above 500 mm in height
   - All structures – this includes all bespoke play equipment items, stairs, handrails and balustrades etc.

Management

4. The Landscape Protection Area (LPA) was set aside in accordance with condition 4 of Ministerial Statement 297. The existing LPA Management Plan was prepared in accordance with the original CDP approved in 1994. The management plan is to be contemporised to reflect current management practice and submitted to the City for approval prior to handover.

5. In accordance with the LPA Management Plan 1994 intent, the applicant is to submit signage plan, outlining wayfinding to the top of the dune and other walking trails.

Irrigation

6. The mainline is to be PN10 Poly for portions of mainline within road reserve adjacent to residential properties (for the length of mainline within Israelite Ave). The applicant is to provide confirmation of each fusion welded join and photos of installation, prior to back filling installation.

7. The applicant must install an inline water meter at the first point irrigation enters the reserve to monitor water usage at the respective location. The connection must be made before the first solenoid valve and be installed in a rectangular valve box for ease of access.

8. The irrigation system must be installed as per the 'City of Rockingham' Specifications, (Rev 12, June 2019). The applicant is requested to familiarise themselves with this document to ensure strict compliance.

   The applicant is also advised that irrigation mainline is not accepted within the road reserve without prior approval from the City of Rockingham. Locations illustrated on the approved drawings are supported, provided that all road crossings are sleeved/ducted in accordance with the City's standard irrigation specifications.

   Solenoid valve control cables must be Tyflo multi-strand copper conductors sheathed in polyethylene suitable for direct burial.

   All Solenoid control cables must then be installed in light duty (LD) grey electrical conduit. The contractor must size the conduit to suit the number of cables to be installed. Inspection junctions must be used at each change in direction and inspection tees at each solenoid valve.

   Failure to comply may result in the applicant having to retro-fit all solenoid wiring in accordance with the above directive.

Appendix 4

9. The applicant is required to submit service records for both the bore pump and iron filter systems three (3) months prior to handover. This includes, but not limited to the following; pump flow and pressure tests, dated annual pump/motor/iron filter service reports and chemical water analysis. The findings and recommendations of the reports are to be addressed by the applicant to the satisfaction of the City, prior to handover. The works may include; replacement pump/motor parts, bore developing, column inspection and/or bore dosing for iron bacteria etc.

10. All planting is to be offset a minimum 300mm from all sprinklers with consideration to mature plant growth.

11. All tree irrigation supply is to be balanced independently from any other station to enable future disconnection if required.

12. Where the proposed mainline extends from the POS and enters the road reserve and associated verge areas adjoining residential properties, the applicant must inform the residential property owners of the proposed works and reinstate the verge areas accordingly.

13. All sprinklers on the road kerb line, within median islands, roundabouts and adjacent to car parking bays are to have concrete surrounds installed.

Accessibility

14. All universal access issues being addressed as defined by the *Disability Discrimination Act 1992.*

15. All paths identified to be universally accessible must be designed in accordance with AS1428.1 (2009), including all handrails, balustrades, kerb ramps, landings and gradients.

16. All steps and handrails systems in public areas must comply with the Australian Building code. Detail 1: Step Section A, Sheet 204 does not show handrail extending past the last step or on the landing Sheet 205.

17. Tactile ground surface indicators must be provided in accordance with AS/NZS 1428.4.1:2009 and the Australian Building Code.

Underground Services

18. The applicant is responsible to undertake all necessary checks, i.e '*Dial before you Dig*' to identify and protect underground services at all times, prior to works commence.

Landscape Hard Works

19. All path networks within the road reserve must be approved under the Civil Engineering approval and subject to the respective approval conditions.

20. Any footpaths constructed must comply with the City's standard specifications and any pram ramps must be installed in accordance with the City's engineering standard details. Pram ramps are to be installed on both sides of the carriageway where paths meet the road reserve.

Appendix 4

21. Concrete footpath construction joint details must be in accordance with the City's standard engineering specifications. Note: Preference is to use a 'Lock joint' type system rather than 'canite' joint products.

22. Applicant to complete the interface with Minderloo Crescent, this includes installing required pram ramps (on both sides of the road, to the City's standard specifications), bollards, fencing (including replacing the boundary fence to neighbouring, number 50 Minderoo Cr, if necessary) and low fuel planting with mulch. Pram ramps must be perpendicular to the road centreline to minimise the crossing distance.

23. All pavements, surfaces including exposed aggregate surfaces must be installed as per manufacturer's specification. All exposed aggregated surfaces must have appropriate expansion joints installed to industry standards, including full cut joints to avoid cracking.

24. 'Insitu Asphalt Paving' detail for the all abilities access path to the dune summit is to be submitted to the City for approval prior to construction. A formed concrete edge beam is required or similar to retain the asphalt surface.

25. Proposed footpath east to west (connecting to the Strategic Firebreak) is to be bitumen stabilised limestone 2.0m wide, with a swinging pedestrian access gate (currently shown only 1.5m wide). This is to be installed regardless of the timing of the Strategic Firebreak, as it defines low threat vegetation areas.

26. Proposed north - south stairs from the corner of Runaway Approach are to be pegged out on site and reviewed with consideration to avoid unnecessary clearing, duplication of pathways and possible alternatives.



Landscape Drawing - Cover Sheet

27. All proposed stairs to be certified by a structural engineer, noting that the current drawings suggest post centre spacing's that exceeding the labelled 2000mm centres – see Detail 2 Sheet L205. Material colours and finishes of decking and balustrades to be circulated to the City, prior to installation.

28. Supply and install 200mm (W) x 150mm (D) extruded flush concrete kerb between all turf and garden and/or mulch only areas (colour to match plain grey concrete footpaths).

Appendix 4

29. Any proposed stone pitching must be securely fastened with a commercial cement bonding agent or similar, with no gaps for weed growth to the satisfaction of the City.

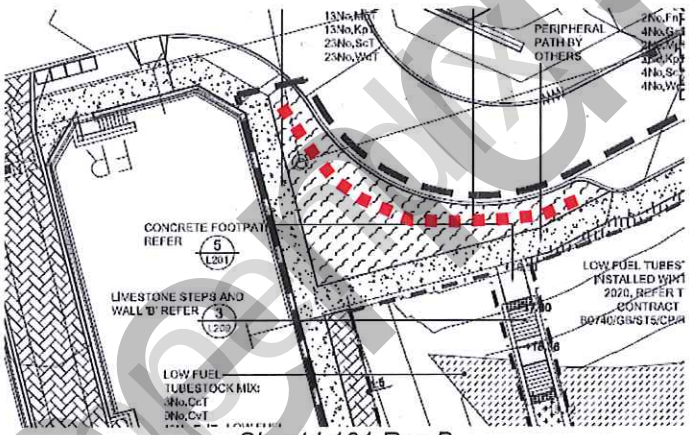
Infrastructure

30. Bollards must be installed at 1.5 metre centres in areas where unauthorised access is likely to occur and/or on the boundary of the public open space. Timber Bollards to be 125mm diameter dome topped, unpainted finish. All timbers to be appropriately treated suitable for in-ground use, CCA pressure treated H4 minimum standard.

    The City endeavours to standardise the bollard style across the City and failure to comply with the condition may result in the applicant having to retro-fit non-compliant bollards to meet the above directive.

    Bollards placed within the centre of footpaths that limited the width of footpath are not supported and should be placed either side of the footpath. Removable bollards within footpaths may be considered on request.

31. The applicant is to underwrite the installation of bollards if necessary to protect the vegetation proposed within the verge area illustrated below.



Sheet L101 Rev B

32. All retaining walls and vertical surfaces must be anti - graffiti coated.

33. All structural steel work to be Hot Dipped Galvanised (HDG). Powered coating is generally not supported and where practical must be galvanised with a 2-pack paint system and non-sacrificial Wattyl anti-graffiti coated.

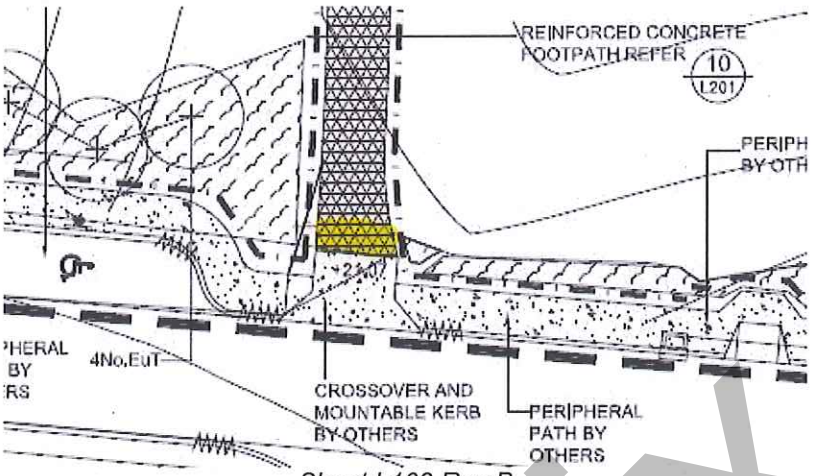
34. Pedestrian swinging gates are to be in accordance with City standard specifications being RSD-517 Rev 3.

35. A service gate keyed to the City of Rockingham locking system must be installed, accompanied by a 150mm reinforced concrete ramp (crossover) from the road carriageway including appropriate flush/mountable kerb and reinforced concrete footpath section.

    This includes providing two (2) vehicle cross overs and gates to the strategic firebreak, at the end of Minderoo Crescent and south of Minderoo Reserve. Cross overs must be installed in accordance with the City's standard engineering drawing for 'commercial crossovers'.

Appendix 4

36. Suitable removable lockable bollards are required at the trafficable vehicle access south of the site.



Sheet L103 Rev B

37. Root control barriers such as the 'Root Director' by StrataGreen or approved equivalent shall be installed to all trees, where trees are located closer than 1.5 metres of any hardstand surface including all trees within playground area.

Furniture

38. Any drinking fountain or potable (scheme) water facility where the water service size is greater than 25mm must be assessed for a risk rating for a backflow prevention device in accordance with Water Corporation Building and Plumbing Handbook. Results of this assessment (from Water Corporation) must be circulated to the City prior to install. In the case that a back flow prevention device is require it must be installed in accordance with water corporation specifications including all required testing, with a copy of the results provided to Water Corporation and the City.

    An anti-tamper isolation valve must be installed no greater than one (1) meter from the base of any water facility i.e. a drinking fountain, water fountain in an accessible location and housed in lockable unit.

    Potable water facilities must be tested and confirmed lead free prior to the Developers practical completion.

    All associated fixtures and fittings must be stainless steel and not anodised brass. Taps that are readily accessible by children (and in play areas) must have an anti-tamper or switch-off mechanism.

    New drinking fountains and/or any new plumbing works must be installed by a Licensed Plumber, in accordance with advice received from the Department of Commerce, Building Commission.

    The Licensed Plumber must provide a copy of the compliance certificate for the works carried out to assure the plumbing work is in accordance with all the necessary regulations/standards and warrants the works.

    A detailed drawing showing the location of the water service, isolation valve and connection points must also be provided prior to the Developers practical completion.

APPENDIX 4

This information must also be submitted on the combined Irrigation, Electrical and Water - As Constructed Drawing.

39. Two (2) waste enclosures including the 240 litre wheeled bin insert are to be provided at central locations and accessible for maintenance. The City of Rockingham approved styles are Street Furniture Australia, model (WBE-F240) and Landmark Engineering model Norfolk 240 Lt or an approved equivalent, which must be installed to the satisfaction of the City of Rockingham. Natural timber enclosure panels will not be supported. All enclosures must be accompanied with a roof cover.

40. Applicant to inform the City's Waste Services of any Dog Bag Dispensers installed. The City of Rockingham approved style is the 'Exteria' Dog Bag Dispenser with key lock. Any variations are to be approved by the City, prior to installation.

41. All park furniture and elements must be installed and maintained (for period of 24 months) to the manufacturer's specifications and recommendations, in accordance with the product warranty, including application of anti-graffiti coatings or comparable approved product. All park furniture and elements are preferred to be surface mounted unless otherwise specified.

Playground Equipment

42. All playground installations must be installed and maintained in accordance with all relevant Australian Standards AS 4685:2014 1-6, 11 and all relevant amendments including additional criteria outlined in the following; AS 4685.0:2017 Playground equipment and surfacing Part 0: Development, installation, inspection, maintenance and operation.

    The applicant must provide evidence of 'Operational' and 'Comprehensive' playground inspections in accordance AS 4685.0:2017 and supply copies of inspections quarterly to the City's Senior Landscape Architect, for the duration of the maintenance period or until agreed handover to the City.

43. Suitable impact absorbing surfacing, termed soft-fall must be installed, wherever falls from fixed or portable playground equipment is possible. All playground softfall installations must be installed in accordance with Australian standards AS/NZS 4422:1996 - Playground Surfacing - Specifications, Requirements & Test Methods.

44. The applicant is to provide an independent comprehensive playground safety inspection (including all natural play elements) at the time of the Developer's practical completion; annually and again no later than one (1) month prior to the POS handover date. All remediation work required as a consequence of the inspections must be undertaken by the Developer to the satisfaction of the City of Rockingham.

45. Boulders and natural logs to be installed within the playground must be sized to prevent movement or alternatively must be securely fasted / mortared in place to the satisfaction of the City.

46. Proposed 'River Bed Section' detail on sheet L215 Rev A is to be updated to state that the base of the river bed is to be 'Liquid Limestone', as per the plan view – sheet L106 Rev B. Ensure that the fall height from the balance log does not exceed 550mm.

47. Proposed locations of 'Tree Poles' Sheet L216 within the playground must be approved by the City, prior to installation.

Appendix 4

48. The Cubby House finishes and colours are to be provided to the City for information, prior to construction. The decorative panels on cubby one will be monitored during the maintenance period and if they are found to deteriorate, create on-going compliance issues or difficult to source replacement parts, they are to be removed and replaced with modwood timber panels, prior to handover.

49. The proposed trampolines are to be replaced with an alternative play equipment item. Proposed substitution equipment is to be submitted to the City for approval prior to ordering equipment.

Lighting and Electrical

50. The electrical drawings for the installation of the BBQ and cubical, must be submitted for approval prior construction. Following installation the electrical safety certification and as constructed drawings (amalgamated with irrigation drawings), must be submitted prior to the developer's practical completion.

51. The electrical BBQ must be keyed to the City of Rockingham locking system prior to handover.

52. A robust pole mounted security light fitting is to be provided to support the install and use of the BBQ. Recommended pole and fitting as follows:

    Green Frog Systems; Pole - GFS-6MMH-60GP (6M Mid-hinge HDG pole) and GFS-Guardian-25-4K - GFS Guardian 25 Solar light 4K CCT or an approved equivalent must be approved by the City prior to purchasing the light fitting.

    Lighting poles are to be a minimum of 4.5 metres in height and be installed in accordance with manufacturer's guidelines and a copy of the structural certification for the light pole and foundation must be submitted to the City prior to Developers Practical Completion.

53. Due to the City's concern with the limited aesthetic level of the proposed lighting 'Lumorail LED' installed within the stair handrail. The lighting must be provided on both sides of the stair handrails. Additionally a singular robust pole mounted solar panel security light fitting is to be provided at the top of the stairs to deter anti-social behaviour. This solar light could be on a motion sensor.

54. The lighting control is to be operated by a photo electrical cell (PE) attached to the side of an appropriately sized electrical control cabinet.

55. The electrical cubical is to be similar freestanding unit as the Irrigation Cubical Design. All designs should be circulated to the City for review, prior to installation.

56. All electrical installations must comply with all relevant Australian standards, i.e AS/NZS 3000, AS/NZS 1158:2010 Lighting for Roads and Public Spaces, AS/NZS 5033 Installation and Safety Requirements for photovoltaic (PV) arrays and all relevant amendments.

57. The City will engage an independent Electrical contractor to undertake an electrical audit within the public open space and the applicant must rectify all defects or omissions identified prior to handover. The audit will be at the cost of the City, any required works will be at the cost of the applicant.

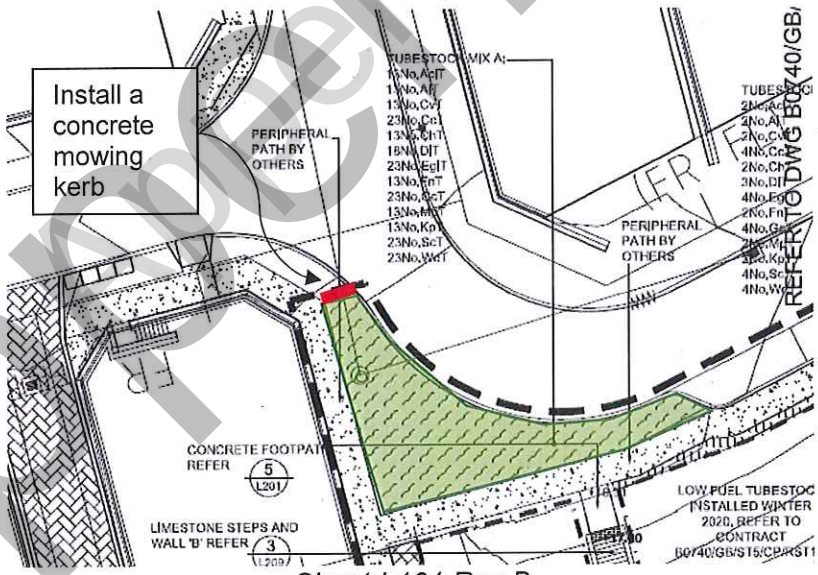
Appendix 4

Landscape Soft Works

58. The north eastern boundary batter is currently approximately 1: 2.5 grade, which is recommended to be modified to accommodate a planted, maintainable slope. The City's preference is to either achieve a 1:4 batter or maximum 1:3 batter, or revert to the original concept which was including some stone wall retaining, where necessary. The treatment should be resolved on site with the City's Senior Landscape Architect.



59. The POS development and maintenance must adhere to the Estate Fire Management Plan requirements, including planting the area below with low threat vegetation – currently proposed to be 'Mixed Tubestock Planting'.



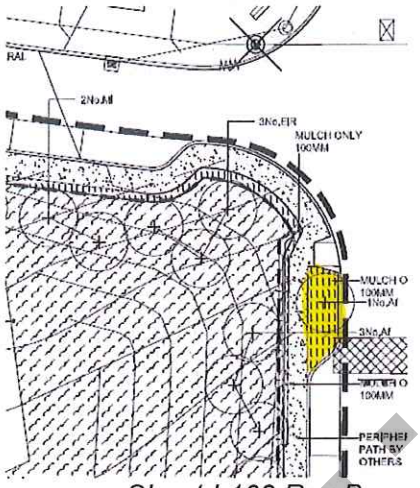
Sheet L101 Rev B

60. Existing areas of low fuel planting, identified on the plans as 'Stage 5 Revegetation installed winter 2020', are to be infill planted with additional approved species to recover plant loss and install species that could not be sourced in 2020.

61. Low Fuel Tubestock Mix, is to incorporate a greater percentage of *Carpoborotus virescens* i.e minimum of 25% coverage.

Attachment 4

62. Large street roadside nib on Elvina Vista as shown below, is to be planted with' Low Fuel Tubestock'. Proposed street tree is to be located further south of the pram ramp to avoid impact on trafficable sightlines to pram ramp.



Sheet L102 Rev B

63. Plant spacings must be no less than **800mm** centres, to allow for future mature plant growth and prevent plant overcrowding which is likely to cause disease and/or plant removal.

64. No street tree must be planted any closer than five (5) metres from any overhead service pole or street lamp. No street tree must be planted closer than two (2) metres from any side entry drainage pit or service chamber located within road reserve.

65. Street trees must be installed in accordance with the Utility's Providers Code of Practice for Western Australia, 1 June 2015.

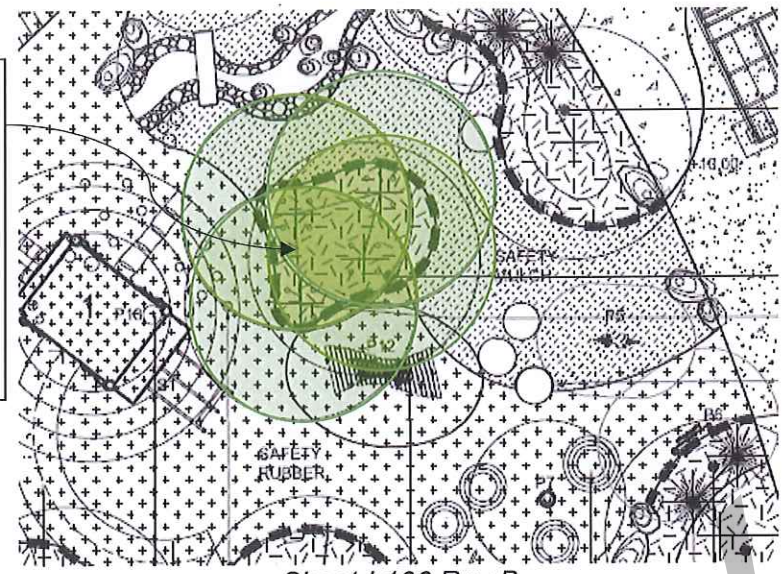
66. All street trees planted in verges are to be mulched at the base, to prevent damage and retain moisture. The stem is to be kept clear of mulch to prevent fungal attack.

67. All trees in *garden* areas are to be a minimum of 1.5-2.0 metres from hardstand areas and infrastructure such as retaining walls, to protect infrastructure from upheaval and damage.

68. All trees within the playground area are to be sufficiently spaced for mature growth, include tree root barriers and separation from edge treatments and/or soft fall areas. See below area where the number of trees are to be reduced.

Appendix 4

Reduce the amount of trees within small planted areas for example this area should only have 2x trees, not 4 trees please



Sheet L106 Rev B

69. All trees planting in *grassed* areas to be mulched at the base to prevent mowing damage. The stem is also to be clear of mulch to prevent fungal attack. Trees to be planted in clusters or groups within turf areas must be spaced no less than 2.5 metres apart (measurement is from the outside of the mulched tree ring) to allow for efficient mowing practices between the individual trees.

70. Plant location adjacent to any footpath and/or traffic intersections within road reserve (garden beds at the back of kerb) should be placed to allow for the expected plant growth, ie not exceed 600mm height to affect safety zones, and not require continuous pruning to prevent overhanging onto footpaths.

71. Organic mulch material must be applied to all garden beds and importantly all non-irrigated tube stock planting to the minimum compacted depth of 75 -100 mm. The mulch must be free of weeds, seeds and other propagates and must be capable of decomposing into humus in time, but able to maintain a reasonably persistent site, and be resistant to wind scour.

    A uniformly graded material having a nominal diameter of 25 mm, (not greater than 50 mm and not less than 19 mm in any one dimension), must be acceptable.

    The applicant may, unless otherwise specified, substitute other materials, provided that in the opinion of the City of Rockingham, the characteristics of type, quality, finish, appearance, and/or performance are not less than specified.

    The supplier's delivery docket for bark mulch must be retained by the applicant and a copy may be requested by the City prior to handover.

72. Turf must be '*Pennisetum clandestinum*' (Kikuyu grass) (Roll On – Instant) free from weeds, fungus, insect pests, or other deleterious material. Turf must be certified free of the Sting nematode (*Ibipora lolii*). The applicant must provide evidence to the City, based on independent nematode testing by a recognised laboratory within the previous three months, that no Sting nematode's have been detected on the production area of the turf farm where the turf is sourced, prior to Developers practical completion.

73. All grass mowing slopes must be no greater than 1:6.

Appendix 4

As – Constructed Information

74. The applicant must provide all as constructed drawings and associated data/ reports in the following formats, CAD (dwg, dgn), PDF prior to the City attending the Developer's practical completion meeting, which includes, but not limited to the following:

- landscape, building licence/structural certification.
  - Include scheme water supply and isolation valves paint colours (on dwg or asset register) for repair/re-painting purposes.
- playground equipment including a parts list/maintenance, warranty information, and manufactures certificate of compliance, installer and dates
- irrigation – (amalgamate electrical data, scheme water supply on the irrigation drawings).
- electrical drawings including cubical and electrical certificate of compliance.

75. **Please Note:** As constructed open space data must be provided in A-Spec three weeks after the Developers practical completion. As-constructed data (A-Spec) must include all elements within the POS including any civil engineering aspects such as footpaths, retaining walls and stormwater drainage elements implemented as part of this approval. All A-spec data must be supplied in GIS ready format (Mapinfo, TAB, SHP, MID/MIF) in accordance with the A-Spec digital data specification.

76. The applicant must complete the attached 'Quantity Register' for all elements within the POS. The information is for the purpose of fair value assessment, maintenance, replacement forecasting and insurance. It must be provided at the time of the Developer's practical completion.

Landscape Practical Completion and Maintenance Period

As part of the landscape approval process the applicant is required to inform the City of Rockingham of the Landscape Contractor's date of practical completion. It is also customary for the applicant to invite a City representative to a meeting following this date to establish that all landscape treatments have been installed per the agreed conditions, and confirm the commencement date of the **three (3) year maintenance period** in accordance with Condition 4 of the Approved GB Landscape Protection Plan Dec 1994. The applicant is also required to confirm that the respective public open space parcel(s) have been created and a Management Order issued in favour of the City.

The applicant is required to arrange an onsite meeting with a City Parks Services representative, 18 (eighteen) months after recognising the applicant's practical completion. This meeting is to identify any defects or omissions which may impact on the future handover of the public open space (POS) asset.

Handover Process

Three (3) months prior to the anticipated handover dated of the respective works, a detailed inspection of the POS is to be carried out in the presence of the applicant and/or representative. The applicant is responsible to contact the City's Parks Services representative to arrange this inspection. Any unacceptable or incomplete works identified during this inspection must be rectified prior to the final handover to the City. Failure to complete the works will result in an extension of the maintenance period.

Appendix 4

All conditions within the official approval must be addressed prior to proposed handover. In cases where conditions have not been addressed, the City will not accept care and control until such time they have been completed.

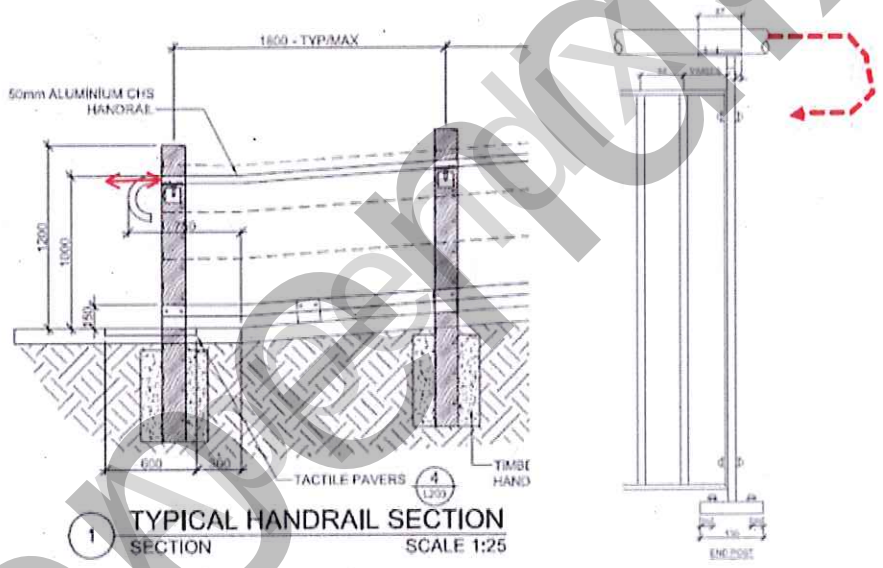
Approval Timeframes

If the development subject of this landscape approval has not substantially commenced within a period of two years from the date of this letter, the approval must lapse and be of no further effect. Where an approval has lapsed, no development must be carried out without the further approval of the City having first been sought and obtained.

Advice Notes:

Condition (3) The City of Rockingham's Building Department can be contacted on 9528 0333 to discuss any issues relating to the Building Licence Approvals.

Condition (15) The 'Typical Handrail Section' (Detail 1, Sheet 211) is currently not compliant as a ramp handrail must extend 300mm to the surface below. Additionally the Balustrade Post Detail 'End Post' (Detail 1, Sheet 203), does not show how the handrail terminates, it must turn down in accordance with the standards.



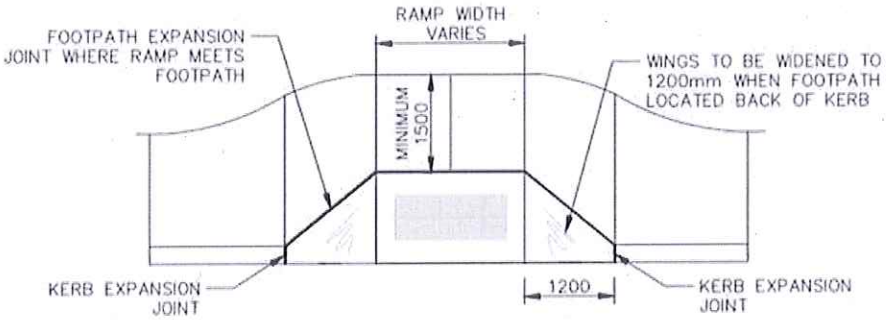
Sheets L211 and L203

Condition (17) AS/NZS 1428.4.1:2009 Design for access and mobility - Means to assist the orientation of people with vision impairment - Tactile ground surface indicators

Condition (20) Standard footpath and pram ramp construction drawings can be found on the City of Rockingham website: https://rockingham.wa.gov.au/planning-and-building/development/subdivisions

Condition (22) Pram ramps must be perpendicular to the road centreline to minimise the crossing distance and the minimum distance behind the ramp is incorporated as illustrated below. For standard Pram ramp details refer to the City's website: https://rockingham.wa.gov.au/planning-and-building/development/subdivisions

Appendix 4



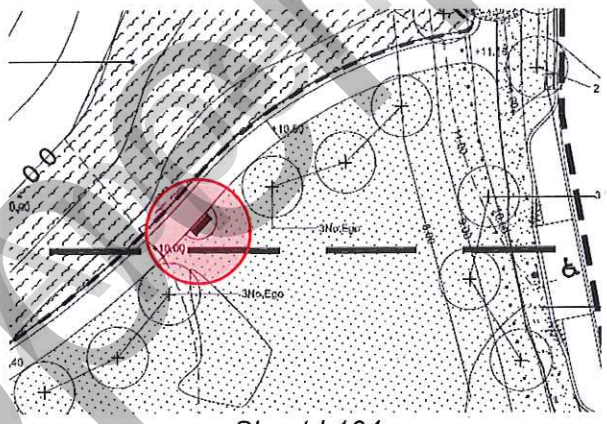
6 Back of Kerb Path and Pram Ramp Detail

Number, 50 Minderoo Crescent is currently owned by Housing Authority. PEET are to confirm the intentions (if known) for this land and for the proposed boundary fencing treatment with Minderoo Reserve.

Condition (35) With regards to locking systems requirements contact the City of Rockingham Asset Maintenance on 9528 8630 during office hours.

Condition (39) the applicant is advised that the location of the waste receptacle/s is to be determined following consultation with the City of Rockingham's Waste Service Coordinator. Contact can be made on 9528 8550 during office hours.

Condition (41) The plans do not currently label proposed bench seats. Consider switching out bench seat for picnic setting in the below area. This is to provide variety of users the opportunity to use the site and not necessarily be associated with the Playground area.

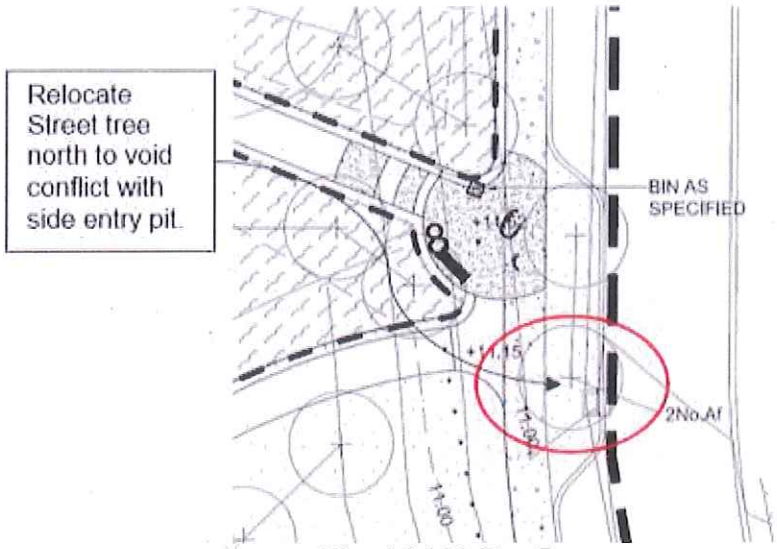


Sheet L104

Condition (55) Standard electrical cubical drawings can be found on the City's website: https://rockingham.wa.gov.au/planning-and-building/development/subdivisions

Condition (64) Sheet L02 Rev B, Street tree conflicts with side entry drainage pits see below.

APPENDIX 4



Sheet L102 Rev B

If you have any questions regarding any of the above please contact Natalie Watkinson on 9527 0742 during office hours.

Yours faithfully

JAMES HENSON
MANAGER LAND
& DEVELOPMENT INFRASTRUCTURE

Appendix 4

Dampier Drive

Warnbro Sound Ave

Minderoo Cres

S1

S2

M

N

Q

P1

R

T

P2

Legend:

- Extent of Local structure plan
- Shrubs
- Drainage swale with littoral tubestock
- **Roll on turf**
- Footpath
- Low fire fuel vegetation
- Terraced retaining wall
- Rehabilitation planting
- Existing coastal bush
- City of Rockingham conservation reserve
- Landscape protection area
- Entry statement
- Shade structure
- Fitness equipment station
- Play area
- 5m width fire break. Existing cleared areas to be considered in order to retain as much existing vegetation as possible.
- Vehicle access gate

LANDSCAPE PROTECTION AREAS 'M'
Located throughout the proposed Lot 3 development, the landscape protection areas are highlighted as areas to be protected and retained and the proposed landscape design is not dissimilar to the original approved Open Space and Landscape Structure (1994). The four separate sites have been recognized as significant natural features and the landscape design is heavily focused around the retention of the dunal formation. With the integration of interpretive signage, viewing decks and platforms, pedestrian walkways, stand alone exercise equipment and strategically placed shade elements, the landscape protection areas will provide active and passive recreation to both future and existing residents.
The focus on keeping as many proposed footpaths along existing tracks is imperative and by providing walk trails and circular routes, walking, jogging and cycling is encouraged. Degraded areas shall be rehabilitated or landscaped appropriately to suit the existing features.
Clearing and earth working along lot boundaries and road edges is required with proposed tiered walls where steep level change occurs.
Fire management will be an important component of the design and ongoing maintenance of this public open space.

CONSERVATION RESERVE 'N'
Adjoining two landscape protection areas 'M' and the existing residential subdivision, this conservation reserve has been highlighted for retention due to the significant natural dunal features. Minor landscape works are proposed with formalized footpaths installed and rehabilitation works to degraded areas. Fire management will be an important component of the design and ongoing maintenance of this conservation reserve. Footpaths and installation of low plants at the designated planting density as per the document Plant Guide within the Building Protection Zone for the Swan Coastal Plain of Western Australia work as a low fuel area. PEET will maintain the site as per the attached conditions, for the lifetime of the project with the City to assume control of the site after this time and continue the required maintenance.

PLANT SPECIES	
LOW FUEL TUBESTOCK MIX	**BPZ separation distance**
Conostylis candicans	Height 0.4 m, APZ spacing 1.2 m
Carpobrotus virescens	Height 0.8 m, APZ spacing 2.4m
Eremophila glabra (groundcover)	Height 0.4 m, APZ spacing 1.2 m
Kennedia prostrata	Prostrate shrub, creeper
Myoporum parvifolium	Height 0.08 m, APZ spacing 0.24 m
Suaeda australis	Height up to 0.9 m, APZ spacing 2.7 m
Threlkeldia diffusa	Height 0.4 – 1 m, APZ spacing 1.2 – 3 m
Westringea dampieri	Height 0.64 m, APZ spacing 1.92 m

DRAINAGE BASINS 'P1 & P2'
The public open space areas allocated as P1 and P2 are landscaped drainage basins that hold a large volume of storm water. However they also provide passive and visual amenity. All drainage basins are walled with some balustraded for safety if required. Footpaths, seating, viewing decks and signage feature throughout ensuring that these POS areas are useable and enhance the estate from a visual perspective. Where the drainage basins abut lots, screen tree and shrub planting are proposed to respect privacy and prevent access.

NEIGHBOURHOOD PARK 'Q'
Centrally located within the Lot 3 development, this neighbourhood park provides active and passive recreation facilities similar to POS 'T' within lot 2. The proposal details a grassed kick-about area over existing degraded land that encourages active play within this part of the development.
Shade trees surround the grassed area, with 2 formal shade structures at either side with barbecue and picnic facilities.
A nature play area nestles at the base of the existing dune with play for all ages and a set of timber steps lead up to the central lookout at the top of the hill.

NEIGHBOURHOOD PARK 'R'
This public open space is adjoined to one of the landscape protection areas 'M' and as such acts as a transition between active formalized open space and the retained and protected dunal landform. This POS features open grassed kick-about areas, circular footpath walks, exercise equipment, a shade structure with seating and formalized tree and shrub planting. Retaining walls are required to absorb level change in this POS, but can also act as seat walls and areas for artwork.

LANDSCAPE SPACE 'S1& S2'
The strategically placed spaces S1 and S2 will be restricted use drainage basins or landscaped entry statements of a high aesthetic nature. Due to the site constraints these additional areas allocated purely for drainage assist with the encouragement of infiltration of storm water at source. Planted with water wise species of shrubs, littoral plants and trees, the vegetation will assist with nutrient stripping, water absorption and midge and mosquito control.

LANDSCAPE SPACE 'T'
This space will be a passive landscaped area that acts as a buffer to the landscape protection areas 'M'. All other landscaping will be predominantly soft works with supplementing tree, shrub or rehabilitation planting to the dunal formations to provide a fluent landscape space. These areas will be primarily for passive recreation and provide a visually aesthetic outlook from proposed lots with a formal landscaped area and a backdrop of the large retained landscape beyond.

epcad.com.au

GOLDEN BAY Lot 3: Landscape Master Plan Version 14

SCALE NTS 0 10 20 50

scale : NTS @ A1 date : 06th July 2020

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EPCAD

APPENDIX 5

Appendix 9

LOT 9027 DAMPIER DRIVE, GOLDEN BAY

LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY

Prepared for:	Peet Golden Bay Pty Ltd Department of Communities
Report Date:	27 April 2021
Version:	1
Report No.	2021-564

Appendix 5

pgv ENVIRONMENTAL

CONTENTS

Contents i

List of Attachments 1

1 INTRODUCTION 3

2 LANDSCAPE PROTECTION AREAS 4

2.1 General Description 4

2.2 Central Dune 4

2.3 Western Interface 4

2.4 South Western Interface 5

2.5 Mandurah Hill Area 5

3 METHODOLOGY 6

3.1 Flora and Vegetation Survey 6

3.2 Weed Survey 6

4 RESULTS 7

4.1 Timing 7

4.2 Survey Conditions 7

4.3 Climate 8

4.4 Naturemap Database Search 9

4.5 TEC and PEC Desktop Search 11

4.6 Flora 11

4.7 Vegetation 12

4.7.1 Vegetation Complex 12

4.7.2 Vegetation Type 12

4.7.3 Vegetation Condition 15

4.8 Conservation Significance of Flora and Vegetation 15

4.8.1 Flora 15

4.8.2 Vegetation 16

4.9 Weed Density 16

4.9.1 Mandurah Hill Area 16

4.9.2 South West Interface 16

4.9.3 Western Interface 17

4.9.4 Central Dune 17

4.10 Significant Weed Species 17

Appendix 5

4.10.1 Mandurah Hill Area 17
4.10.2 South Western Interface 18
4.10.3 Western Interface 18
4.10.4 Central Dune 19
5 SUMMARY AND CONCLUSION 20
5.1 Flora and Vegetation Survey 20
5.1.1 Flora 20
5.1.2 Vegetation 20
5.2 Weed Survey 20
6 REFERENCES 22

Appendix 5

LIST OF ATTACHMENTS

Tables

Table 1: Statement of Botanical Survey Conditions

Table 2: Conservation Significant Flora Identified in Database Searches

Table 3: Threatened and Priority Ecological Communities likely to occur within 5km of the Site

Table 4: Vegetation Types

Table 5: Vegetation Condition Rating Scale

Table 6: Quadrat percentage coverage in the Mandurah Hill Area

Table 7: Proportion of quadrats with each percentage coverage in the South West Interface

Table 8: Proportion of quadrats with each percentage coverage in the Western Interface

Table 9: Proportion of quadrats with each percentage coverage in the Central Dune Area

Graphs

Graph 1: Mean climate statistics compared to 2020

Figures

Figure 1: Site Location

Figure 2: Landscape Protection Area Boundaries

Figure 3: Vegetation Types

Figure 4: Vegetation Condition

Figure 5: Overall Weed Map for Mandurah Hill Area

Figure 6: Overall Weed Map for South Western Interface

Figure 7: Overall Weed Map for Western Interface

Figure 8: Overall Weed Map for Central Dune

Figure 9: Geraldton Carnation Weed (*Euphorbia terracina*) in Mandurah Hill Area

Figure 10: Rose Pelargonium (*Pelargonium capitatum*) in Mandurah Hill Area

Figure 11: Onion Weed (*Trachyandra divaricata*) in Mandurah Hill Area

Figure 12: Geraldton Carnation Weed (*Euphorbia terracina*) in South Western Interface

Appendix 5

Figure 13: Rose Pelargonium (*Pelargonium capitatum*) in South Western Interface

Figure 14: Branched Onion Weed (*Trachyandra divaricata*) in South Western Interface

Figure 15: Brazilian Pepper (Schinus terebinthifolius) in South Western Interface

Figure 16: Century Plant (*Agave americana*) and Geraldton Wax (*Chamelaucium uncinatum*) in South Western Interface

Figure 17: Geraldton Carnation Weed (*Euphorbia terracina*) in Western Interface

Figure 18: Rose Pelargonium (*Pelargonium capitatum*) in Western Interface

Figure 19: Branched Onion Weed (*Trachyandra divaricata*) in Western Interface

Figure 20: Narrow-leafed Cottonbush (*Gomphocarpus fruticosus*) and Geraldton Carnation Weed (*Euphorbia terracina*) in Central Dune

Figure 21: Rose Pelargonium (*Pelargonium capitatum*) in Central Dune

Figure 22: Branched Onion Weed (*Trachyandra divaricata*) in Central Dune

Appendices

Appendix 1: Weed Mapping Grids

Appendix 2: Naturemap Report

Appendix 3: Conservation Codes

Appendix 4: Species List

Appendix 5: Quadrat Data

Appendix 5

1 INTRODUCTION

Lot 9027 Dampier Drive Golden Bay is located approximately 20km south of the Rockingham City Centre (Figure 1) in the City of Rockingham.

The Lot is zoned for urban development in the Metropolitan Region Scheme and the City of Rockingham Town Planning Scheme No 2. A Structure Plan has been approved for the Lot with modifications to the southern area through a subdivision approval in 2019. The Plan includes a mix of residential lots, Public Open Space and a Landscape Protection Area.

The requirement to include a Landscape Protection Area in the development of the Lot dates back to the original environmental approval for development in the early 1990s. Urban development of the Lot (formerly called Lot 3 Dampier Drive) was assessed by the Environmental Protection Authority (EPA) in 1992 and granted environmental approval through Ministerial Statement (MS) 297 in January 1993. Condition 4-1 of MS 297 required planning measures to recognise and protect the landscape value of the parabolic dune ridge on the Lot. To meet the condition, the Golden Bay Landscape Protection Management Plan was prepared by Mitchell Goff and Associates in November 1994. The Management Plan was approved by the EPA and other agencies.

Given the nearly 25-year date of the Landscape Protection Management Plan, the developers have committed to preparing an updated Management Plan for the Landscape Protection Area (LPA). The updated plan is currently being prepared. This Baseline Flora, Vegetation and Weed Survey report has been prepared to provide a description of the current status of the vegetation in the LPA and to assist in identifying any management actions to be included in the Management Plan.

Appendix 5

2 LANDSCAPE PROTECTION AREAS

2.1 General Description

The boundary of the Landscape Protection Area (LPA) included in the Concept Development Plan is generally in accordance with the boundaries of the LPA as approved in 1994.

The LPA was chosen for a number of reasons, but primarily for the retention of significant landscape features but also to provide a buffer to existing housing development as it was in 1994. The LPA contains four areas, described in the original Management Plan as:

- The retained Central Dune;
- The Western Interface Reserve;
- The South Western Face or Southern Boundary; and
- The Mandurah Hill Area (Figure 2)

These names have been retained with slight modification in this report.

A review of the LPA by the developer's civil engineers identified some significant topographical constraints with respect to being able to develop residential lots and streets adjacent to some of the steeper sections of the LPA. As a result, some additional Public Open Space (POS) has been added to the South Western area that effectively enlarges the LPA in this area by a considerable amount.

Some other part of the LPA required vegetation to be cleared in the LPA to provide a stable interface between the residential development and the steep dunes of the LPA. Some earthworks into the LPA were deemed to be acceptable in the original Management Plan. These areas on the northern side of the LPA adjacent to the first stages of development on the Lot and have been cleared, re-graded and revegetated.

The total area of the LPA, including the additional POS in the South Western Area is around 15.5ha.

2.2 Central Dune

The Central Dune area contains the highest parts of the Lot with to peaks at 34-37m AHD. The land slopes down steeply to the north, east and south of the peaks. The area slopes more gently down to the west and joins up with the Western Interface part of the LPA.

2.3 Western Interface

The Western Interface area extends north-south along the central western boundary of the Lot for approximately 420m and varies in width from 60m – 150m. The landform is more undulating than the Central Dune area with some dune ridges and swales ranging in elevation from 11-22m AHD.

The northern end of the Western Interface area has already been ceded as a Conservation Reserve to the City of Rockingham.

Appendix 5

2.4 South Western Interface

The South Western Interface extends along the south-western part of the Lot and includes a small original LPA section and a larger POS section. The LPA section is only about 30m wide from north to south and includes a narrow west-east ridge that slopes steeply down to the south and north. As a result of the steep contours an additional area of POS was added, making the area 80-120m wide.

2.5 Mandurah Hill Area

The south-east area of the LPA includes a portion of Mandurah Hill which has its peak at 42m AHD very close to the southeastern boundary of the area. The Mandurah Hill area slopes down from the high point in the south-east corner to low points on the western and northern boundaries around 23m AHD.

Appendix 5

3 METHODOLOGY

3.1 Flora and Vegetation Survey

A Detailed Flora and Vegetation Survey was undertaken in accordance with the *EPA Technical Guidance: Flora and Vegetation Surveys* (EPA, 2016). The survey included the following:

- Review of previous flora and vegetation reports for Golden Bay;
- Desktop search and review of the Department of Biodiversity, Conservation and Attractions (DBCA) Naturemap database to determine if any species that have been listed since the previous studies were completed have been recorded in the area;
- Examination of historic and recent aerial photography and contour and soil maps to provisionally identify vegetation types and condition;
- Field survey using quadrats to record native and introduced species as well as a thorough site walkover of any areas of native vegetation;
- Recording of any significant plant species using a hand-held GPS;
- Description and mapping of vegetation types and vegetation condition; and
- Compilation of a flora list.

3.2 Weed Survey

A weed survey was undertaken using a 20m x 20m grid pattern, recording significant weed species and coverage at each intersecting point (Appendix 1).

Significant weeds were those that are:

- Weeds listed under Section 22 of the *Biosecurity and Agriculture Management Act 2007* (BAM Act);
- Weeds of National Significance (WoNS);
- Priority weeds identified as being priority weeds in their reserves as identified in the *Reserve Prioritisation Report* (City of Rockingham, 2015); or
- Weeds listed in *Environmental weed census and prioritisation, Swan NRM Region 2008.*

Significant Weeds were recorded and mapped in accordance with *Standard Operating Procedure Techniques for mapping weed distribution and cover in bushland and wetlands* (SOP 22.1) (DEC, 2011) and *Technical Guidance – Flora and Vegetation Surveys for Environmental Impact Assessment* (Technical Guidance) (Government of Western Australia, 2016). Weed occurrences were captured using a hand-held GPS.

The coverage of the significant weeds was rated using the Braun-Blanquet scale as per the SOP 22.1 as follows:

- 1 = Less than 5% cover
- 2 = 6 – 75 % cover
- 3 = 76 – 100 % cover

Appendix 5

4 RESULTS

4.1 Timing

The 2020 flora and vegetation survey was undertaken on 16 October 2020 and the weed survey was undertaken on 19 October 2020.

4.2 Survey Conditions

The conditions that the survey was undertaken in are presented in Table 1 in order to assess the adequacy of the survey. In summary there were no constraints to the survey.

Table 1: Statement of Botanical Survey Conditions

Issue	Constraints (Y/N)*	Comment
Competency/experience of the consultant conducting the survey	No	Dr Paul van der Moezel has extensive botanical survey experience in the Perth Metropolitan Region, including previous surveys on the subject land
Proportion of the flora identified^	Yes	The timing of the survey in mid-October was optimal to identify all flora species on the site.
Sources of information (historic/recent or new data)	No	The flora in the Perth Metropolitan Region is well documented.
Proportion of the task achieved and further work that may need to be undertaken	No	No follow-up survey required as no conservation significant flora expected to occur in other seasons
Timing/weather/season/cycle	No	The survey was undertaken in mid-spring. 2020 was a good year for ephemeral species despite slightly lower rainfall in the region.
Disturbances (Fire)	No	The fire age of the vegetation was mostly greater than 5 years with some areas burnt less than 5 years ago but recovering well.
Intensity of survey (e.g. In retrospect was the intensity adequate)	No	The time spent on the site (approx. 7hr) was considered adequate for the size of the site (15.5ha), ease of access and low diversity of species and vegetation types.
Completeness (e.g. was relevant area fully surveyed)	No	
Resources (e.g. degree of expertise available for plant identification)	No	Experienced botanist undertook plant identifications on site.
Remoteness and/or access problems	No	Easily accessible site in the Perth Metropolitan Region.
Availability of contextual (e.g. bioregional) information for the study area.	No	Bush Forever

*Constraints have been rated as Significant, Moderate or No constraints

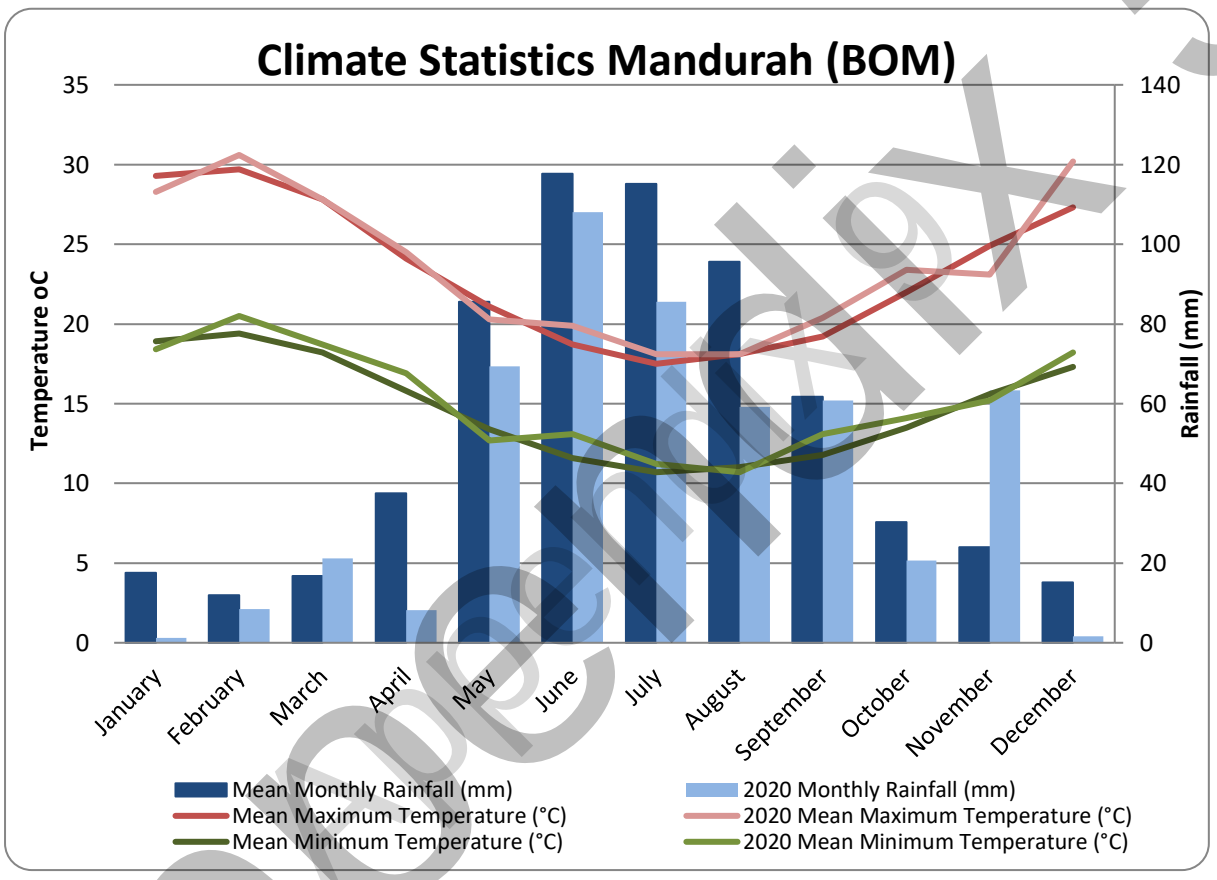
^Fungi and nonvascular flora (e.g. algae, mosses and liverworts) were not specifically surveyed for during the survey.

Appendix 5

4.3 Climate

Western Australia experiences a Mediterranean climate with warm dry summers and wet cool winters. Peak rainfall periods are between May and September. Climate statistics from the Bureau of Meteorology (BOM, 2020) can be used to compare the survey climatic conditions to mean values for temperature maximum, minimum and rainfall (Graph 1). The statistics have been measured on the Mandurah Site (BOM Site Number 009977), which has been collecting data from 2001 (BOM, 2021).

Graph 1: Mean climate statistics compared to 2020



Comparatively, the seasonal conditions for the 2020 monitoring were drier than average from April to August, similar in September and slightly below average in October. The 2020 temperatures were generally slightly higher than the average minimum temperatures with average maxima similar (Graph 1).

Appendix 5

4.4 Naturemap Database Search

A search of the Naturemap Database (Appendix 2) indicates that a number of species that are listed as Endangered, Threatened or Priority have been located within a 10km radius of the site (Table 2).

Table 2: Conservation Significant Flora Identified in Database Searches

Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act	Habitat*	Likelihood to occur on the site
Drakaea elastica	Glossy-leafed Hammer Orchid	Schedule 1	Endangered	The Glossy-leafed Hammer Orchid prefers low-lying situations adjoining winter-wet swamps. This species does not survive in disturbed areas.	No – no winter wet habitat
Diuris drummondii	Tall Donkey Orchid	Schedule 3	Vulnerable	The Tall Donkey Orchid grows in low-lying depressions, swamps, in areas that contain surface water well into summer (Brown et al., 2013).	No – no swamp habitat
Acacia benthamii		Priority 2		*Acacia benthamii* grows on sand, typically on limestone breakaways	Highly Unlikely – no breakaway habitat
Cardamine paucijuga		Priority 2		*Cardamine paucijuga* is found on moist flats in calcareous clay over limestone.	No – not moist calcareous habitat
Beyeria cinerea subsp. *cinerea*		Priority 3		*Beyeria cinerea* subsp. *cinerea* grows in sand over limestone on road verges, gullies	Unlikely – not known from m dune habitat
Calandrinia oraria		Priority 3		*Calandrinia oraria* is restricted to coastal habitats in low coastal heath or forbland on small white sand dunes immediately adjacent to the beach and up to 100–150 m inland in slightly larger dunes with grey or grey-brown sands (Obbens, 2014).	Highly Unlikely – too far from the coast
Dillwynia dillwynioides		Priority 3		*Dillwynia dillwynioides* occurs in sandy soils in winter-wet depressions.	No – no winter wet habitat
Lasiopetalum membranaceum		Priority 3		*Lasiopetalum membranaceum* grows in sand over limestone.	Unlikely – not known from dune habitat
Pimelea calcicola		Priority 3		*Pimelea calcicola* occurs in sand on coastal limestone ridges.	Highly Unlikely – no limestone ridges

Appendix 5

Scientific Name	Common Name	Conservation Status (WA)	Status under EPBC Act	Habitat*	Likelihood to occur on the site
Schoenus capillifolius		Priority 3		*Schoenus capillifolius* grows in brown mud on claypans.	No – no claypan habitat
Sphaerolobium calcicola		Priority 3		*Sphaerolobium calcicola* grows in white-grey-brown sand, sandy clay over limestone, black peaty sandy clay on tall dunes, winter-wet flats, interdunal swamps, low-lying areas.	Highly Unlikely – not suitable habitat
Caladenia speciosa	Sandplain White Spider Orchid	Priority 4		Sandplain White Spider Orchid occurs in white, grey or black sand in Banksia or Jarrah Woodland (Brown *et al.*, 2013).	Highly Unlikely – not woodland habitat
Conostylis pauciflora subsp. *pauciflora*		Priority 4		*Conostylis pauciflora* subsp. *pauciflora* occurs in grey sand, limestone on hillslopes, consolidated dunes in coastal areas.	Possible
Jacksonia sericea	Waldjumi	Priority 4		Waldjumi grows in calcareous and sandy soils.	Unlikely – not limestone habitat preferred by this species
Parsonsia diaphanophleba		Priority 4		*Parsonsia diaphanophleba* occurs in alluvial soils along rivers.	No – not alluvial habitat
Stylidium longitubum	Jumping Jacks	Priority 4		Jumping Jacks prefer sandy clay, clay in seasonal wetlands.	No – no wetland habitat

* Habitat description from Florabase (DPaW, 2016) or SPRAT (DoEE, 2017) unless otherwise denoted

Conservation Codes are shown in Appendix 3

Appendix 5

4.5 TEC and PEC Desktop Search

The Threatened (TEC) and Priority Ecological Communities (PEC) that may occur on the site are outlined in Table 3.

Table 3: Threatened and Priority Ecological Communities likely to occur within 5km of the Site

Ecological Community	Description	Conservation Status WA	Status under the EPBC Act	Potential to occur
SCP19a	Sedgelands in Holocene dune swales of the southern Swan Coastal Plain.	Critically Endangered	Endangered (Listed as FCT19)	Unlikely
SCP19b	Woodlands over sedgelands in Holocene dune swales of the southern Swan Coastal Plain.	Critically Endangered	Endangered (Listed as FCT19)	No - no woodland vegetation
Banksia WL SCP	Banksia Dominated Woodlands of the Swan Coastal Plain IBRA Region	Priority 3	Endangered	No – no Banksias on site
Tuart woodlands	Tuart (*Eucalyptus gomphocephala*) woodlands and forests of the Swan Coastal Plain	Priority 3	Critically Endangered	No – no Tuarts on site
SCP29a	Coastal shrublands on shallow sands, southern Swan Coastal Plain	Priority 3		Possible
SCP29b	Acacia shrublands on taller dunes, southern Swan Coastal Plain	Priority 3		Likely

4.6 Flora

A total of 88 plant species were recorded in the survey area (Appendix 4). The total consisted of 53 native and 35 introduced species. The number of native species is low but typical for Quindalup sand dunes and a survey area of only 15.5ha. The percentage of introduced species, 40% is relatively high due to the adjoining residential development and long-term use of the dunes for recreation by pedestrians and off-road bikes.

The dominant plant Families were the Poaceae (Grass family – 9 species, including 2 native and 7 introduced), Asteraceae (Daisy family – 8 species, 5 native and 3 introduced) and the Fabaceae (Wattle and Pea family, 6 species, all native). The low number of species from the Myrtaceae and Proteaceae families reflects the nature of the Quindalup dune soils which typically have low representation of these families.

None of the species are Threatened (Declared Rare) or Priority species.

Non-native species were common along the western boundary of the site adjacent to the existing housing, and many appear to have been planted. Common tree and shrub species include WA Peppermint (*Agonis flexuosa*), Rottnest Island Pine (*Callitris preissii*), Geraldton Wax (*Chamelaucium uncinatum*) and Brazilian Pepper (*Schinus terebinthifolius*).

The batter slopes in the northern part of the survey area have been stabilised with mulch and revegetated with native shrub species.

Appendix 5

A total of eight 10mx10m quadrats were sampled in the survey area (Appendix 5). Species richness in the quadrats ranged from 19-35 which is typical for Quindalup dune vegetation. The percentage of introduced species recorded in the quadrats averaged 27.3%.

4.7 Vegetation

4.7.1 Vegetation Complex

Vegetation Complexes are a broad level of vegetation description which is based on the underlying geomorphology and rainfall (Heddle *et al*., 1980). The areas of remnant native vegetation on the site is part of the Quindalup Complex which is described as:

> 'Coastal dune complex consisting mainly 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 (Heddle *et al.,* 1980)'

4.7.2 Vegetation Type

For small scale sites, such as the survey area, vegetation mapping can be further refined by using vegetation types which are described by the composition and structure of the dominant species rather than based on geomorphology.

Three native vegetation types and one area of exotic species were described and mapped on the site. Vegetation descriptions are provided in Table 4. Vegetation types are mapped in Figure 3.

Appendix 5

Table 4: Vegetation Types

Vegetation Type	Description	Photograph
ArSg *Acacia rostellifera/Spyridium globulosum* Open to Closed Heath	This vegetation type commonly occurred on the mid- to lower slopes and swales on the site. *Acacia rostellifera* was the main shrub up to 2m high and 60-70% cover but *Spyridium globulosum* dominated some patches in the lower swales (photo 2 to the right). *Diplolaena dampieri* was a common tall shrub in some areas. Other common smaller species included *Austrostipa flavescens, Melaleuca systena, Acanthocarpus preissii, Rhagodia baccata, Conostylis candicans, Daucus glochidiatus, Parietaria debilis, Hydrocotyle intertexta* and *Hardenbergia comptoniana.* The soils brown to grey sands. Quadrats GB2, 3, 4 and 8 are representative of this vegetation type.	 

Appendix 5

Vegetation Type	Description	Photograph
ArMsAl *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath	This vegetation type commonly occurred on the upper slopes and ridges on the site. *Acacia rostellifera* was the tallest species but low (1m) and not very dense (15-20%). Common species included *Melaleuca systena, Acacia lasiocarpa, Lomandra maritima, Austrostipa flavescens, Acanthocarpus preissii, Conostylis candicans, Senecio pinnatifolius, Scaevola thesioides, Desmocladus flexuosus, Trachymene pilosa* and *Calandrinia liniflora.* Climbing species were often common including *Hardenbergia comptoniana, Cassytha flava* and *Clematis linearifolia.* The soils were light brown sands. Quadrats GB1, 6 and 7 are representative of this vegetation type.	
SaMsAl *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath	This vegetation type occurred in one small area that was the only area that contained some surface limestone. However, the plant species did not reflect a typical limestone substrate. *Santalum acuminatum* was the tallest shrub at only 1m and 10% cover with *Melaleuca systena, Acacia lasiocarpa, Acanthocarpus preissii* and *Lomandra maritima* common smaller shrubs around 0.3-0.5m high. *Desmocladus flexuosus* and *Opercularia vaginata* were common ground shrubs. The soils were orange-brown sand with some surface limestone. Quadrats GB5 is representative of this vegetation type.	

Appendix 5

4.7.3 Vegetation Condition

The condition of the vegetation for each quadrat was assessed according to the Keighery system described in Bush Forever (Government of Western Australia, 2000). Keighery's condition rating scale ranges from Pristine where the vegetation exhibits no visible signs of disturbance to Completely Degraded where the vegetation structure in no longer intact and without native plant species (Table 5).

Table 5: Vegetation Condition Rating Scale.

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

Source: Government of Western Australia, 2000.

Overall, the condition of the areas of native vegetation in the survey area was high, ranging from Very Good to Good (Figure 4). The number of introduced species throughout the site was relatively high and did not allow an Excellent condition rating to be assigned to any areas.

Some areas had a higher grassy weed understorey, especially in swales and under the *Acacia rostellifera* dense stands and were rated as Good.

Tracks and the western area of non-native tree and shrub plantings were rated as Completely Degraded.

4.8 Conservation Significance of Flora and Vegetation

4.8.1 Flora

No Threatened or Priority species were recorded during the survey.

Appendix 5

4.8.2 Vegetation

Vegetation Complex

The vegetation on the site is part of the Quindalup Complex (Heddle *et al.*, 1980). Approximately 60.49% of the pre-European vegetation extent of this complex remains, of which 9.01% is currently managed by DBCA (DBCA, 2018).

The percentage retention is above EPA's target for minimum 30% retention of vegetation complexes State-wide in the Perth and Peel Region Constrained Areas and the area in protection is just below the 10% minimum criteria for vegetation complexes.

Threatened and Priority Ecological Communities

The Floristic Community Type (FCT) for the three vegetation types was determined using the spreadsheet method which compares the species in the quadrats to the species found in each FCT (Table 12 in Gibson *et al.* 1994). The FCT of all three vegetation types had the highest correlation with FCT 29b 'Acacia shrublands on taller dunes, southern Swan Coastal Plain'. FCT 29b is a Priority 3 Ecological Community at State level.

4.9 Weed Density

4.9.1 Mandurah Hill Area

The overall weed coverage in the Mandurah Hill Area was moderate with 59% of the quadrats recording between 6 and 75% coverage and 22% having greater than 75% coverage (Table 6).

Table 6: Quadrat percentage coverage in the Mandurah Hill Area

Braun-Blanquet Scale	Proportion quadrats with coverage
<5% coverage	19%
6–75% coverage	59%
76–100% coverage	22%

The total weed coverage recorded was used to develop a weed map for the Mandurah Hill Area (Figure 5). The highest density of weeds is located on the south-western and north-eastern corners with a small area in the central part of the southern boundary. The lowest density of weeds is through the central part of the site (Figure 5).

4.9.2 South West Interface

The overall weed coverage in South West Interface is moderate with 38% of the quadrats recording 6-76% coverage and 33% with a coverage greater than 76% (Table 7).

Table 7: Proportion of quadrats with each percentage coverage in the South West Interface

Braun-Blanquet Scale	Proportion quadrats with coverage
<5% coverage	28%
6–75% coverage	38%
76–100% coverage	33%

Appendix 5

The weed map for South West Interface (Figure 6) on the western boundary and scattered areas through the site. The areas that have a moderate coverage of 5-76% are mostly concentrated around areas associated with tracks through the site (Figure 6).

4.9.3 Western Interface

The overall weed coverage in the Western Interface is high with 43% of the quadrats sampled having a weed coverage of >75% (Table 8).

Table 8: Proportion of quadrats with each percentage coverage in the Western Interface

Braun-Blanquet Scale	Proportion quadrats with coverage
<5% coverage	28%
6–75% coverage	29%
76–100% coverage	43%

The weed map for the Western Interface (Figure 7) shows that the areas with higher weed densities are mostly associated with tracks. The ridge in the central parts of the Landscape Protection Area contains very few weeds and small areas in the densest vegetation that contain a low weed coverage (Figure 7).

4.9.4 Central Dune

The overall weed coverage in the Central Dune area is lower than other LPAs with 60% of quadrats having a coverage <5% (Table 6). Only 10% had a weed coverage >75% (Table 9).

Table 9: Proportion of quadrats with each percentage coverage in the Central Dune Area

Braun-Blanquet Scale	Proportion quadrats with coverage
<5% coverage	60%
6–75% coverage	30%
76–100% coverage	10%

The weed map for the Central Dune area (Figure 8) shows that the areas with higher weed densities are mostly associated with tracks. The less disturbed areas in the Landscape Protection Area contains very few weeds (Figure 8).

4.10 Significant Weed Species

4.10.1 Mandurah Hill Area

There were no Declared Weed species recorded.

Geraldton Carnation Weed (*Euphorbia terracina*) is classified as one of the 30 priority weeds on the Swan Coastal Plain (Bettink and Keighery, 2008). This species was recorded in 56% of quadrats and is generally associated with the track to the north of the site but does extend in low densities to the south-eastern corner of the site. There is a higher density infestation in the south-eastern part of the site (Figure 9). It is recommended that Geraldton Carnation Weed be targeted in weed control efforts as it is known to be highly invasive.

Rose Pelargonium (*Pelargonium capitatum*) was recorded in only 17% of quadrats and is located in the south-western part of the site with small dense infestation to the north-west, south-western

Appendix 5

corner and a small, isolated patch in the eastern part of the site (Figure 10). Rose Pelargonium is considered to be a significant environmental weed (Queensland Government, 2015).

Branched Onion Weed (*Trachyandra divaricata*) was present in 12% of quadrats in low densities, mainly in the eastern part of the site and a small infestation on the western boundary (Figure 11). and is considered to be a high priority weed.

4.10.2 South Western Interface

No Declared weed species were recorded in the South Western Interface area.

Geraldton Carnation weed (*Euphorbia terracina*) is a priority species present in the South Western Interface area. Recorded in 27% of the quadrats this species is concentrated along tracks in the Landscape Protection Area (Figure 12) in low (<5%) to moderate densities (6-75% coverage). There are small areas that have a moderate coverage on the western boundary and on the southern boundary in the eastern part (Figure 12).

Rose Pelargonium (*Pelargonium capitatum*) was recorded in 37% of quadrats, mostly in low densities (<5% coverage) associated with the tracks through the site (Figure 13). There was one moderately dense (6-75% coverage) area of this weed in the south-eastern part of the site (Figure 13).

Branched Onion Weed (*Trachyandra divaricata*) occurs in scattered areas in the eastern and southern parts of the site (Figure 14) and was recorded in 22% of quadrats. There is one area in which this species was moderately dense (6-75% coverage) along the track in the central eastern part of the site (Figure 14).

There were three woody weeds recorded on the site. Brazilian Pepper (*Schinus terebinthifolius*) was recorded from three locations and is a Priority Weed in the Swan Natural Resource Management (NRM) Area (DEC, 2016). This species is located in the south-western part of the site (Figure 15). Century Plant (*Agave americana*) and Geraldton Wax (*Chamelaucium uncinatum*) are large weeds that could be prioritised for removal. These species were recorded in the south-western corner of the site (Figure 16).

4.10.3 Western Interface

No Declared weed species were recorded in the Western Interface Area.

Geraldton Carnation Weed (*Euphorbia terracina*) occurred in 39% of quadrats, mainly on the western side of the site at low densities (<5% coverage) (Figure 17). There were two areas that had a higher coverage of 6-75% on the western part of the site and one of high (6-75% and >75% coverage respectively) to the north along the western boundary (Figure 17).

Rose Pelargonium (*Pelargonium capitatum*) was recorded in 36% of the quadrats in scattered areas on the site (Figure 18). There were three infestations that had a coverage of 6-75%, one in the central-western part of the site and one on the eastern boundary in the central part of the site and one area of high density (>75% coverage) in the north-western part of the site (Figure 18).

Trachyandra divaricata (Branched Onion Weed), occurs in scattered areas in the northern part of the site in low densities (<5% coverage) with four areas of higher density (6-75% coverage) in scattered parts of the site (Figure 19). The species was recorded in 19% of quadrats.

Appendix 5

4.10.4 Central Dune

There was one Declared weed species recorded in the Central Dune being *Gomphocarpus fruticosus* (Narrow-leafed Cottonbush) with one individual being recorded in the central part of the site (Figure 20).

Geraldton Carnation Weed (*Euphorbia terracina*) occurred in 26% of quadrats mostly along tracks (Figure 20) in low (<5% coverage) densities. There were four areas of moderate density (6-75% coverage) in the central and eastern part of the site.

Rose Pelargonium (*Pelargonium capitatum*) was present in 36% of quadrats, around tracks and extending into the bushland (Figure 21). The coverage of this species is mostly <5%, however there are two small areas with a coverage between 6 and 75% to the south and in the central part of the site (Figure 21).

Trachyandra divaricata (Branched Onion Weed occurs in areas near tracks (Figure 34) and was present in 5% of quadrats. The coverage is mostly low (<5%) with one area recorded with a moderate coverage between 6 and 75% in the central cleared part of the site (Figure 22).

Appendix 5

5 SUMMARY AND CONCLUSION

5.1 Flora and Vegetation Survey

5.1.1 Flora

A total of 88 species were recorded in the Landscape Protection Area and adjoining POS to be retained as natural bushland. The list included 53 native and 35 introduced species (40% of the total).

No Threatened (Declared Rare) or Priority flora species were recorded on the site.

5.1.2 Vegetation

Three native vegetation types were described and mapped on the site and are typical of Quindalup dunes in the Perth Metropolitan Region with *Acacia rostellifera* the dominant taller shrub and *Melaleuca systena, Acacia lasiocarpa* and *Lomandra maritima* common shrub species.

The Floristic Community Types of all three vegetation types had the highest correlation with FCT 29b 'Acacia shrublands on taller dunes, southern Swan Coastal Plain'. FCT 29b is a Priority 3 Ecological Community at State level.

Most of the areas of native vegetation were rated in Very Good to Good condition. Some vegetation in swales and close to urban development were rated as Degraded due to the higher density of weed species. Tracks and areas of non-native vegetation were rated as Completely Degraded.

5.2 Weed Survey

Mandurah Hill Area

- Overall Weed Coverage in the POS is moderate with areas of heavy infestation along the boundary and a lower weed coverage along the ridge;
- Priority weeds identified in Landscape Protection Area A are:
  - Geraldton Carnation Weed (*Euphorbia terracina*);
  - Rose Pelargonium (*Pelargonium capitatum*); and
  - Branched Onion Weed (*Trachyandra divaricata*).

South Western Interface

- Overall Weed Coverage is generally moderate to high with areas of less weed coverage in areas that have had less disturbance;
- Priority weeds identified in Landscape Protection Area B are:
  - Geraldton Carnation Weed (*Euphorbia terracina*);
  - Rose Pelargonium (*Pelargonium capitatum*);
  - Branched Onion Weed (*Trachyandra divaricata*);
  - Brazilian Pepper (*Schinus terebinthifolius*);
  - Century Plant (Agave americium); and
  - Geraldton Wax (Chamelaucium uncinatum).

Appendix 5

Western Interface

- Overall Weed Coverage in the POS is moderate to high on the western side (>5%) and lower on the eastern side with the highest areas of weed coverage along the tracks;
- Priority weeds identified in Landscape Protection Area C are:
  - Geraldton Carnation Weed (*Euphorbia terracina*);
  - Rose Pelargonium (*Pelargonium capitatum*); and
  - Branched Onion Weed (*Trachyandra divaricata*).

Central Dune

- Overall Weed Coverage in the POS is low with the highest areas of weed coverage associated with tracks;
- One Declared Pest under the BAM Act, *Gomphocarpus fruticosus* (Narrow-leafed Cottonbush) was recorded from a single location;
- Priority weeds identified in Landscape Protection Area D are:
  - Geraldton Carnation Weed (*Euphorbia terracina*);
  - Rose Pelargonium (*Pelargonium capitatum*); and
  - Branched Onion Weed (*Trachyandra divaricata*).

Appendix 5

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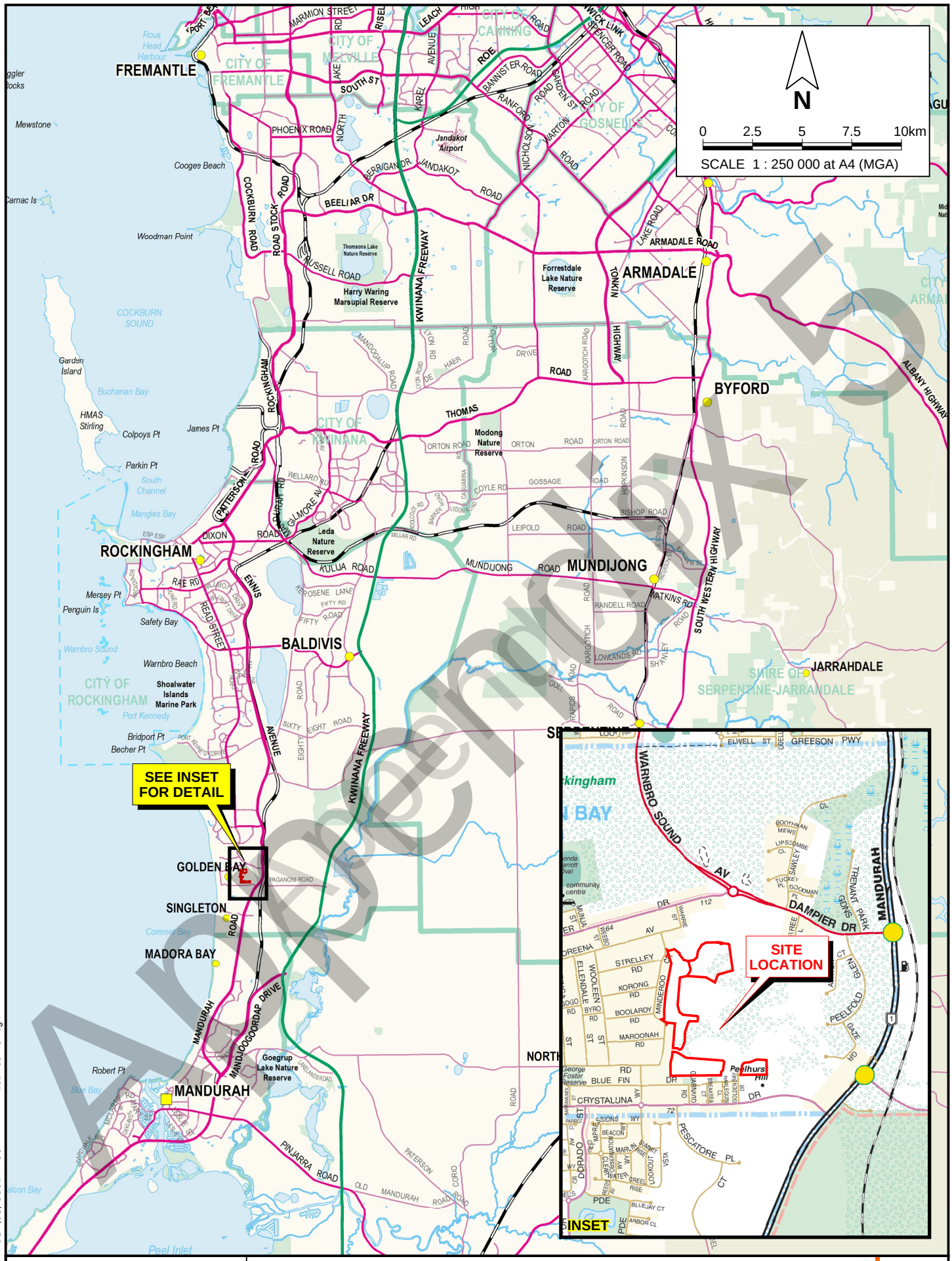
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Appendix 5

FIGURES

Appendix 5



Appendix D

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f01.dgn

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

SITE LOCATION

Figure 1

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f02.dgn



CADASTRAL SOURCE: Landgate, August 2020.
CONTOURS SOURCE: Dept. of Agriculture, 2000.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

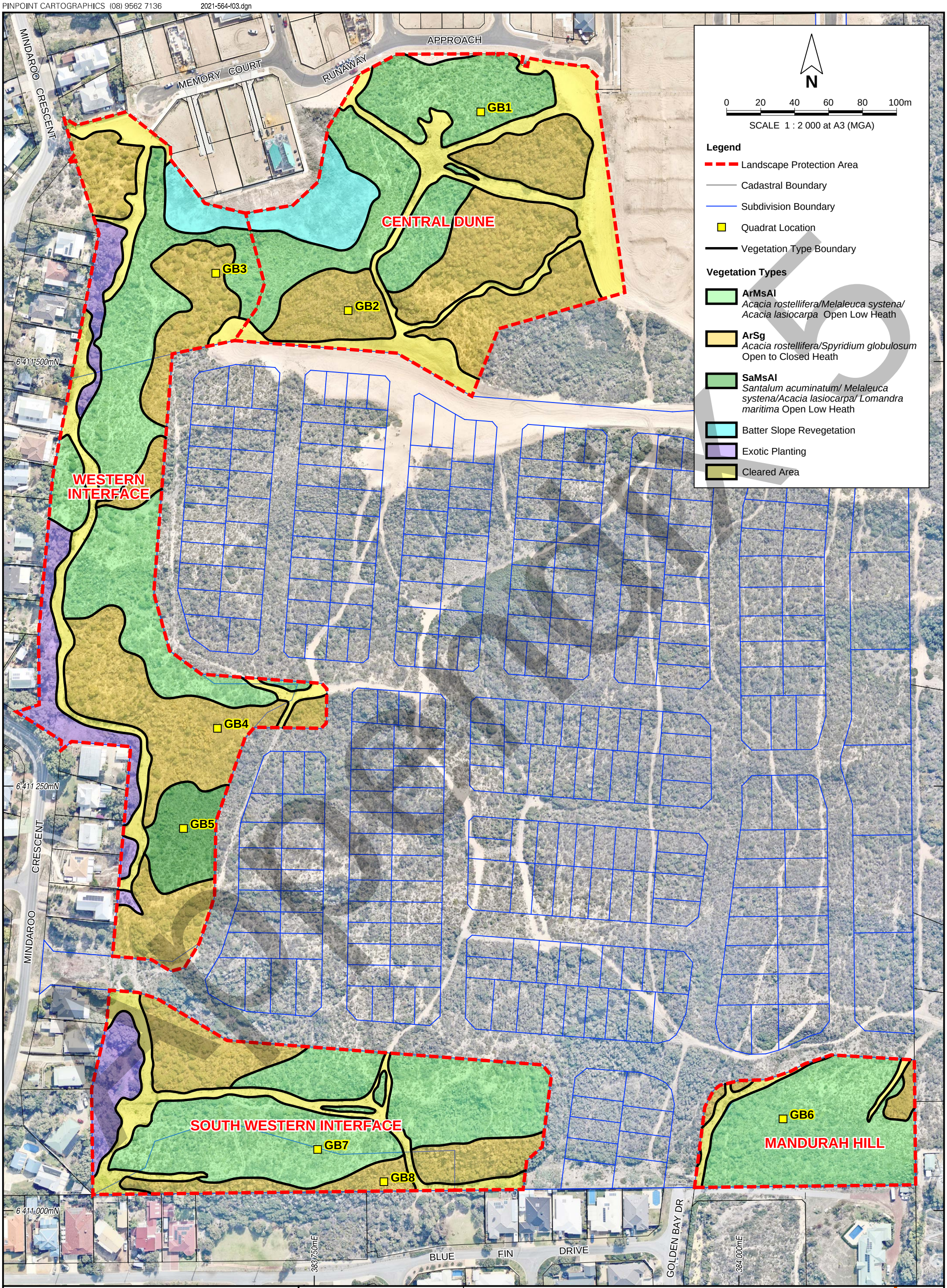
Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

LANDSCAPE PROTECTION AREA BOUNDARIES

Figure 2

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f03.dgn



CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

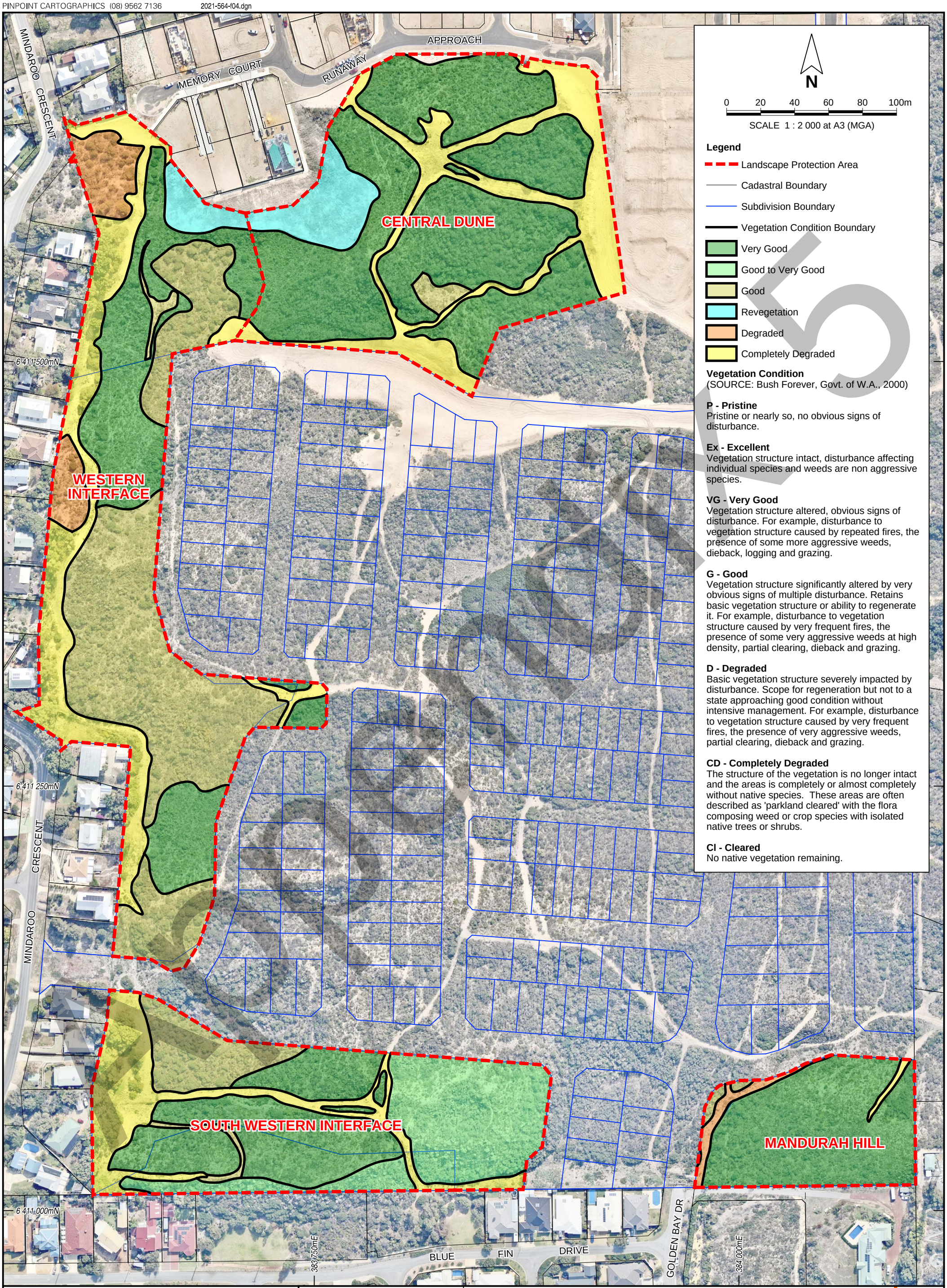
Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

VEGETATION TYPES

Figure 3

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f04.dgn



Legend

- Landscape Protection Area
- Cadastral Boundary
- Subdivision Boundary
- Vegetation Condition Boundary
- Very Good
- Good to Very Good
- Good
- Revegetation
- Degraded
- Completely Degraded

Vegetation Condition
(SOURCE: Bush Forever, Govt. of W.A., 2000)

P - Pristine
Pristine or nearly so, no obvious signs of disturbance.

Ex - Excellent
Vegetation structure intact, disturbance affecting individual species and weeds are non aggressive species.

VG - Very Good
Vegetation structure altered, obvious signs of disturbance. For example, disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.

G - Good
Vegetation structure significantly altered by very obvious signs of multiple disturbance. Retains basic vegetation structure or ability to regenerate it. For example, disturbance to vegetation structure caused by very frequent fires, the presence of some very aggressive weeds at high density, partial clearing, dieback and grazing.

D - Degraded
Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. For example, disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.

CD - Completely Degraded
The structure of the vegetation is no longer intact and the areas is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora composing weed or crop species with isolated native trees or shrubs.

Cl - Cleared
No native vegetation remaining.

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

VEGETATION CONDITION

Figure 4

N

0 5 10 15 20m

SCALE 1 : 400 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 76-100% Coverage
- 6-75% Coverage
- 0-5% Coverage

384 000mE

384 050mE

384 100mE

6 411 100mN

6 411 050mN

9028

153

4039

R 42359

101

102

GOLDEN BAY DRIVE

Apex

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-105.dgn

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021

Job: 10004 Rpt: 2021-564 | Revision: A

OVERALL WEED MAP FOR MANDURAH HILL AREA

Figure 5

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 76-100% Coverage
- 6-75% Coverage
- 0-5% Coverage

743
744
745
746
747
9028
6 411 100mN
6 411 000mN
196
195
194
193
2095
R 28732
383 700mE
383 800mE
8001
R 28732
746
745
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

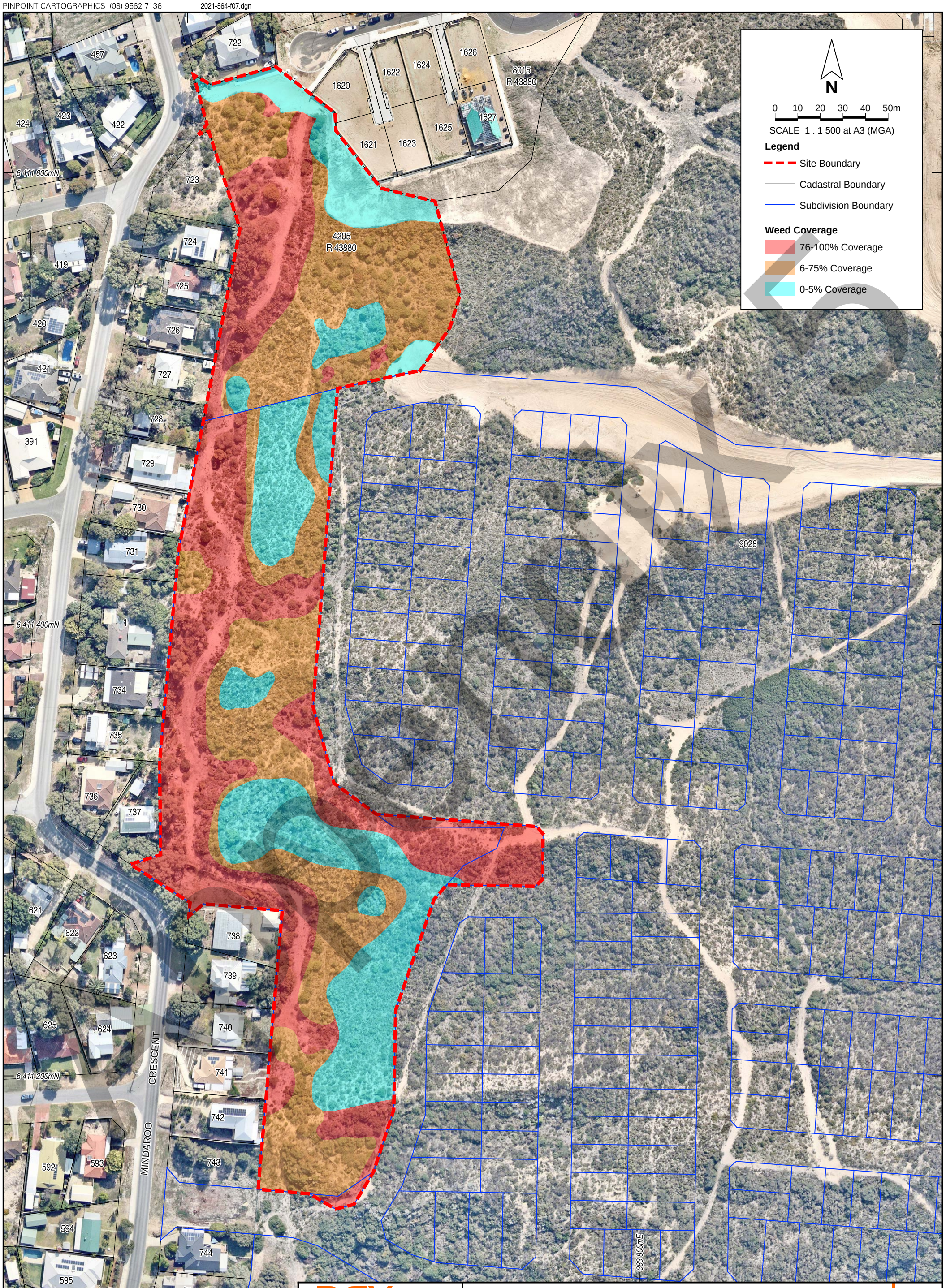
OVERALL WEED MAP FOR SOUTH WESTERN INTERFACE

Figure 6

2021-564-f06.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f07.dgn



CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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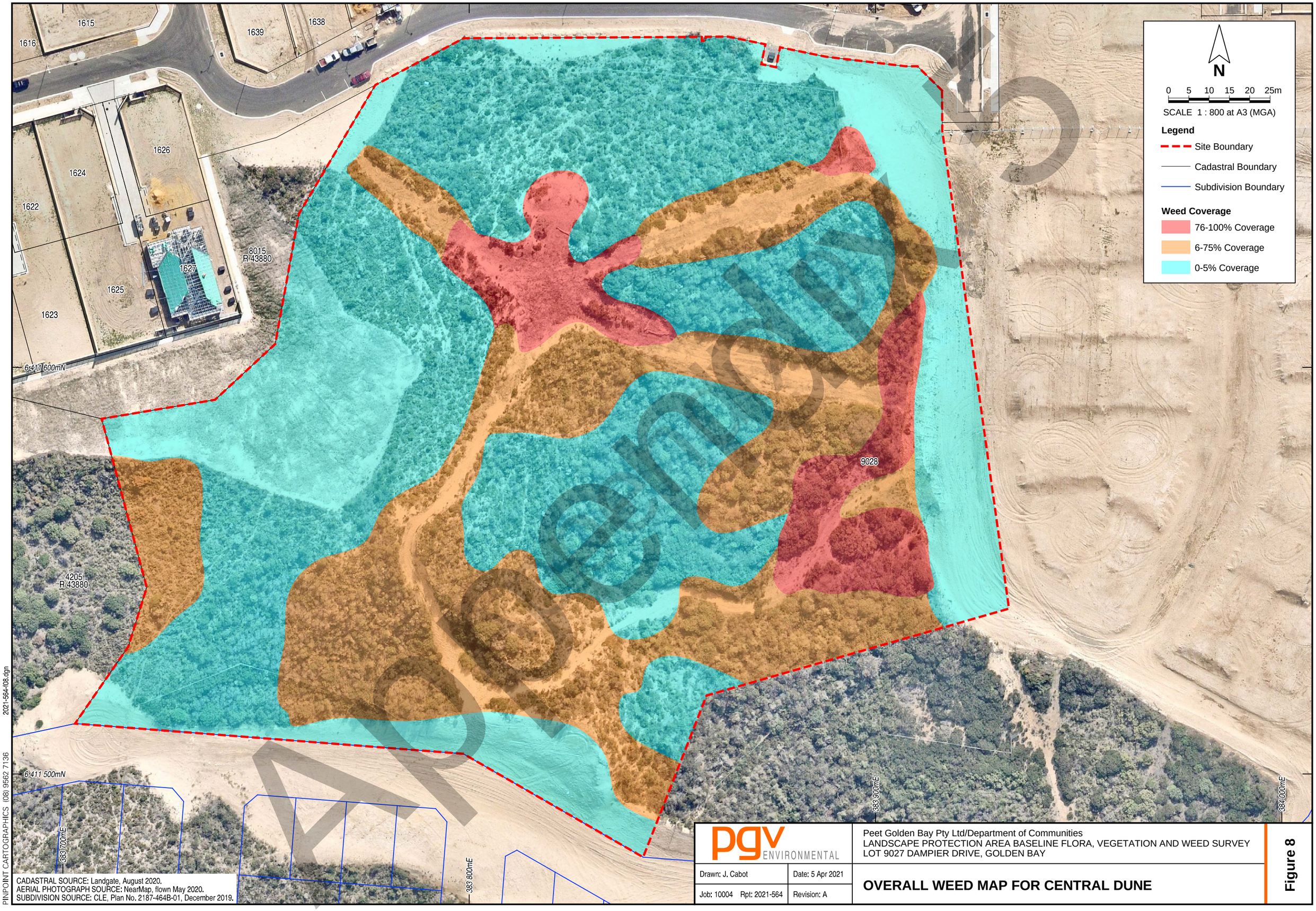
Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021

Job: 10004 Rpt: 2021-564 | Revision: A

OVERALL WEED MAP FOR WESTERN INTERFACE

Figure 7



CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

OVERALL WEED MAP FOR CENTRAL DUNE

Figure 8

2021-564-f08.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

DRAFT

N

0 5 10 15 20m

SCALE 1 : 400 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

384 000mE

384 050mE

384 100mE

6 411 100mN

6 411 050mN

9028

153

4039

R 42359

101

102

GOLDEN BAY DRIVE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

ARCHIVE

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-109.dgn

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021

Job: 10004 Rpt: 2021-564 | Revision: A

GERALDTON CARNATION WEED (*Euphorbia terracina*) IN MANDURAH HILL AREA

Figure 9

N

0 5 10 15 20m

SCALE 1 : 400 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

384 000mE

384 050mE

384 100mE

6 411 100mN

6 411 050mN

9028

153

4039

R 42359

GOLDEN BAY DRIVE

101

102

APPROVED

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

ROSE PELARGONIUM (*Pelargonium capitatum*) IN MANDURAH HILL AREA

Figure 10

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f10.dgn

N

0 5 10 15 20m

SCALE 1 : 400 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 0-5% Coverage

384 000mE

384 050mE

384 100mE

6 411 100mN

6 411 050mN

9028

153

4039

R 42359

GOLDEN BAY DRIVE

101

102

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f11.dgn

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

BRANCHED ONION WEED (*Trachyandra divaricata*) IN MANDURAH HILL AREA

Figure 11

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

743
744
745
746
747
9028
6 411 100mN
6 411 000mN
196
195
194
193
2095
R 28732
8001
R 28732
383 700mE
383 800mE
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

GERALDTON CARNATION WEED (*Euphorbia terracina*) IN SOUTH WESTERN INTERFACE

Figure 12

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f12.dgn

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

743
744
745
746
747
9028
2095
R 28732
8001
R 28732
196
195
194
193
6 411 100mN
6 411 000mN
383 700mE
383 800mE
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

ROSE PELARGONIUM (*Pelargonium capitatum*) IN SOUTH WESTERN INTERFACE

Figure 13

2021-564-f13.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

Site Boundary

Cadastral Boundary

Subdivision Boundary

Weed Coverage

6-75% Coverage

0-5% Coverage

743
744
745
746
747
9028
2095
R 28732
8001
R 28732
196
195
194
193
6 411 000mN
6 411 100mN
383 700mE
383 800mE
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

PINPOINT CARTOGRAPHICS (08) 9562 7136

2021-564-f14.dgn

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

BRANCHED ONION WEED (*Trachyandra divaricata*) IN SOUTH WESTERN INTERFACE

Figure 14

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

743
744
745
746
747
9028
2095
R 28732
8001
R 28732
6 411 100mN
6 411 000mN
383 700mE
383 800mE
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

BRAZILIAN PEPPER (*Schinus terebinthifolius*) IN SOUTH WESTERN INTERFACE

Figure 15

2021-564-f15.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary

Weed Coverage

- 0-5% Coverage

743
744
745
746
747
9028
2095
R 28732
8001
R 28732
6 411 100mN
6 411 000mN
383 700mE
383 800mE
383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

CENTURY PLANT (*Agave americana*) & GERALDTON WAX (*Chamelaucium uncinatum*) IN SOUTH WESTERN INTERFACE

Figure 16

2021-564-f16.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f17.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 500 at A3 (MGA)

Legend

Site Boundary

Cadastral Boundary

Subdivision Boundary

Weed Coverage

6-75% Coverage

0-5% Coverage

722 457 1626 1624 1622 1620 8015 R 43880 1627 1625 1623 1621 424 423 422 6 411 600mN 723 4205 R 43880 724 419 725 420 726 421 727 391 728 729 730 731 9028 6 411 400mN 1 734 735 736 737 621 622 623 738 739 625 624 740 741 742 743 592 593 594 744 595 745 597 596 6 411 200mN CRESCENT MINDAROO 383 600mE 383 800mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021

Job: 10004 Rpt: 2021-564 | Revision: A

GERALDTON CARNATION WEED (*Euphorbia terracina*) IN WESTERN INTERFACE

Figure 17

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f18.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 500 at A3 (MGA)

Legend

Site Boundary

Cadastral Boundary

Subdivision Boundary

Weed Coverage

6-75% Coverage

0-5% Coverage

722 457 1620 1622 1624 1626 8015 R 43880 1627 1625 1621 1623 424 423 422 6 411 600mN 723 4205 R 43880 724 419 725 420 726 421 727 391 728 729 730 731 6 411 400mN 1 734 735 736 737 621 622 623 738 739 625 624 740 741 742 743 592 593 594 744 595 745 597 596 9028 383 600mE 383 800mE CRESCENT MINDAROO

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

Drawn: J. Cabot | Date: 5 Apr 2021

Job: 10004 Rpt: 2021-564 | Revision: A

ROSE PELARGONIUM (*Pelargonium capitatum*) IN WESTERN INTERFACE

Figure 18

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f19.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 500 at A3 (MGA)

Legend

Site Boundary

Cadastral Boundary

Subdivision Boundary

Weed Coverage

6-75% Coverage

0-5% Coverage

722 457 1626 1624 1622 1620 8015 R 43880 1627 1625 1623 1621 424 423 422 6 411 600mN 723 4205 R 43880 724 419 725 420 726 421 727 391 728 729 730 731 6 411 400mN 1 734 735 736 737 621 622 623 738 739 625 624 740 741 742 743 592 593 594 744 595 745 597 596 9028 383 600mE 383 800mE

CRESCENT

MINDAROO

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Job: 10004 Rpt: 2021-564 | Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

BRANCHED ONION WEED (*Trachyandra divaricata*) IN WESTERN INTERFACE

Figure 19

N

0 5 10 15 20 25m

SCALE 1 : 800 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary
- Narrow-leafed Cottonbush Location

Weed Coverage

- 6-75% Coverage
- 0-5% Coverage

1615 1616 1639 1638 1626 1624 1622 1627 1625 1623 8015 R 43880 4205 R 43880 9028

6 411 600mN 6 411 500mN

383 700mE 383 800mE 383 900mE 384 000mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

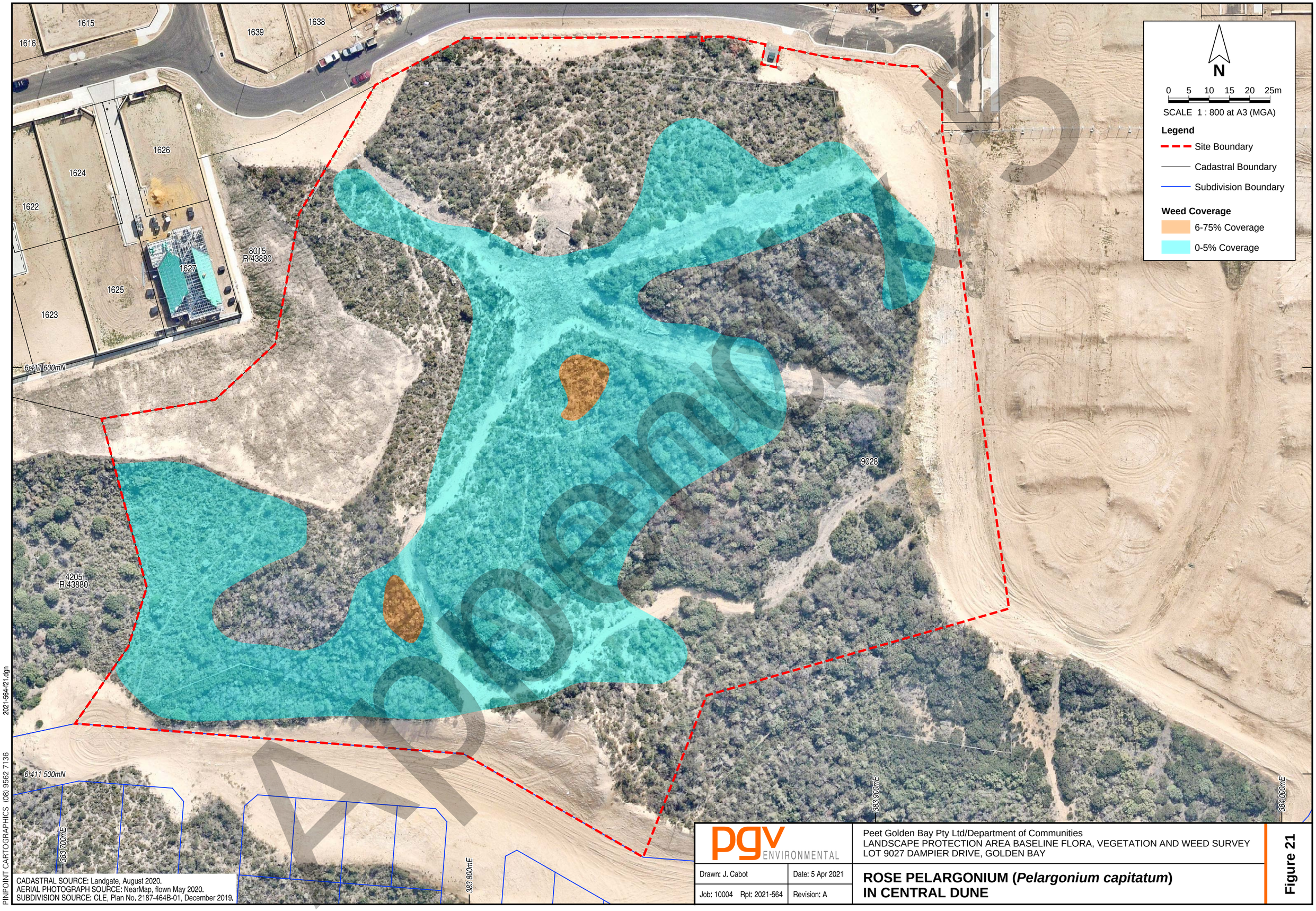
Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

NARROW-LEAFED COTTONBUSH (*Gomphocarpus fructicosus*) & GERALDTON CARNATION WEED (*Euphorbia terracina*) IN CENTRAL DUNE

Figure 20

2021-564-f20.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136



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CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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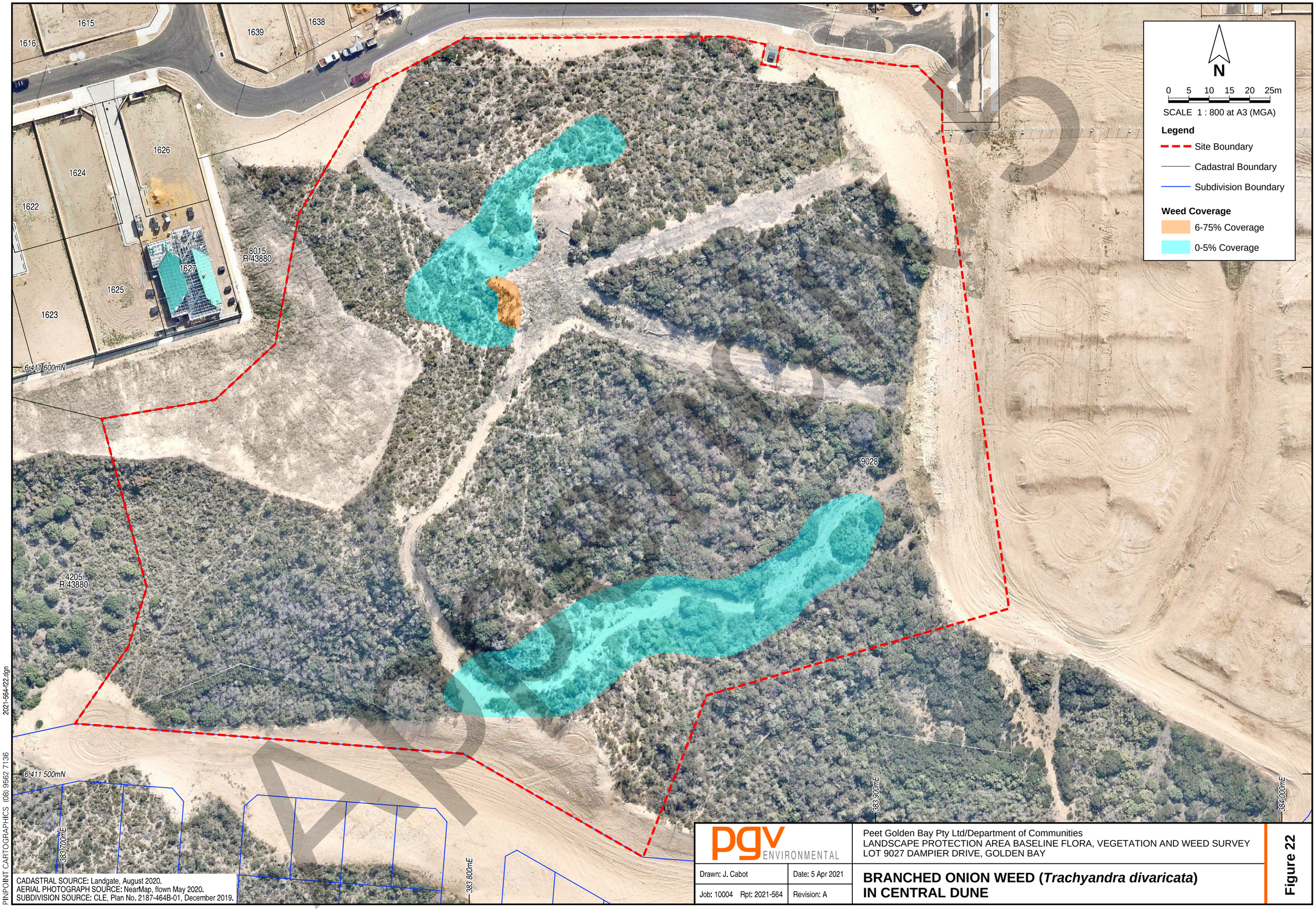
Drawn: J. Cabot | Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564 | Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

ROSE PELARGONIUM (*Pelargonium capitatum*) IN CENTRAL DUNE

Figure 21

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f21.dgn



CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

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Drawn: J. Cabot	Date: 5 Apr 2021
Job: 10004 Rpt: 2021-564	Revision: A

Peet Golden Bay Pty Ltd/Department of Communities
LANDSCAPE PROTECTION AREA BASELINE FLORA, VEGETATION AND WEED SURVEY
LOT 9027 DAMPIER DRIVE, GOLDEN BAY

BRANCHED ONION WEED (*Trachyandra divaricata*) IN CENTRAL DUNE

Figure 22

APPROVED

PINPOINT CARTOGRAPHICS (08) 9562 7136 2021-564-f22.dgn

APPENDIX 1

Weed Mapping Grids

Appendix 5

N

0 5 10 15 20m

SCALE 1 : 400 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary
- Topographic Contour
- 20m Gridline
- Quadrat Location

384 000mE
384 050mE
384 100mE
6 411 100mN
6 411 050mN
6 411 000mN
9028
153
4039
R 42359
101
102

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

10004-LPA-wkpln06.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

pgv ENVIRONMENTAL

Department of Housing
LANDSCAPE PROTECTION AREAS
GOLDEN BAY

Drawn: J. Cabot | Date: 18 Oct 2020
Job: 10004 Rpt: | Revision: A

LANDSCAPE PROTECTION AREA AND POS

Workplan 6

N

0 5 10 15 20 25m

SCALE 1 : 750 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary
- Topographic Contour
- 20m Gridline
- Quadrat Location

743 744 745 746 747 9028 2095 R 28732 8001 R 28732 196 195 194 193

6 411 100mN 6 411 000mN

383 700mE 383 800mE 383 900mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

PINPOINT CARTOGRAPHICS (08) 9562 7136 10004-LPA-wkpln07.dgn

pgv ENVIRONMENTAL

Department of Housing
LANDSCAPE PROTECTION AREAS
GOLDEN BAY

Drawn: J.Cabot | Date: 18 Oct 2020
Job: 10004 Rpt: | Revision: A

LANDSCAPE PROTECTION AREA AND POS

Workplan 2

PINPOINT CARTOGRAPHICS (08) 9562 7136 10004-LPA-wkpln08.dgn

N

0 10 20 30 40 50m

SCALE 1 : 1 000 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Subdivision Boundary
- Topographic Contour
- 20m Gridline
- Quadrat Location

6 411 500mN
6 411 400mN
6 411 300mN
6 411 200mN
383 600mE
383 700mE
383 800mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

Department of Housing
LANDSCAPE PROTECTION AREAS
GOLDEN BAY

Drawn: J. Cabot | Date: 18 Oct 2020

Job: 10004 Rpt: | Revision: A

LANDSCAPE PROTECTION AREA AND POS

Workplan 8

PINPOINT CARTOGRAPHICS (08) 9562 7136 10004-LPA-wkpln09.dgn

N

0 5 10 15 20m

SCALE 1 : 500 at A3 (MGA)

Legend

- Site Boundary
- Cadastral Boundary
- Easement Boundary
- Subdivision Boundary
- Topographic Contour
- 20m Gridline
- Quadrat location

721 722 723 724 725 726 727 728 729

1620 1621 1622 1623 1625

8015 R 43880

4205 R 43880

9028

6 411 650mN 6 411 600mN 6 411 550mN 6 411 500mN

383 600mE 383 650mE 383 700mE

CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

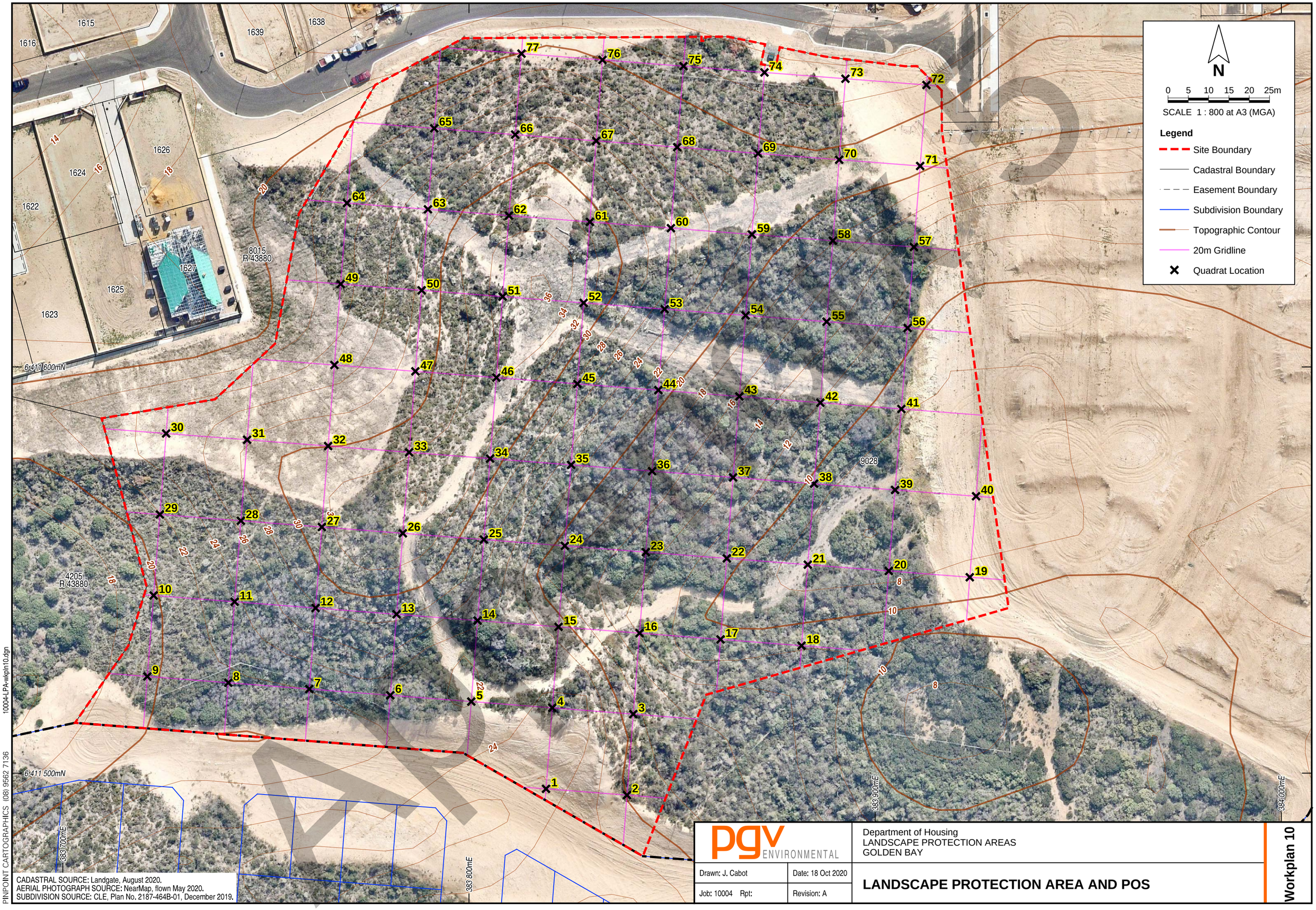
Department of Housing
LANDSCAPE PROTECTION AREAS
GOLDEN BAY

Drawn: J. Cabot | Date: 18 Oct 2020

Job: 10004 Rpt: | Revision: A

LANDSCAPE PROTECTION AREA AND POS

Workplan 9



CADASTRAL SOURCE: Landgate, August 2020.
AERIAL PHOTOGRAPH SOURCE: NearMap, flown May 2020.
SUBDIVISION SOURCE: CLE, Plan No. 2187-464B-01, December 2019.

pgv ENVIRONMENTAL

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LANDSCAPE PROTECTION AREA AND POS

Workplan 10

10004-LPA-wkpln10.dgn

PINPOINT CARTOGRAPHICS (08) 9562 7136

APPENDIX 2

Naturemap Report

Appendix 5

NatureMap
Mapping Western Australia's biodiversity

NatureMap Species Report

Created By Guest user on 11/03/2021

Current Names Only Yes
Core Datasets Only Yes
Method 'By Circle'
Centre 115° 45' 55" E,32° 25' 43" S
Buffer 10km
Group By Conservation Status

Conservation Status	Species	Records
Non-conservation taxon	753	6530
Other specially protected fauna	2	10
Priority 2	2	8
Priority 3	10	53
Priority 4	8	89
Protected under international agreement	22	188
Rare or likely to become extinct	11	312
TOTAL	**808**	**7190**

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Rare or likely to become extinct					
1.	24162	*Bettongia penicillata subsp. ogilbyi (Woylie, Brush-tailed Bettong)*		T	
2.	24784	*Calidris ferruginea (Curlew Sandpiper)*		T	
3.	24790	*Calidris tenuirostris (Great Knot)*		T	
4.	24731	*Calyptorhynchus banksii subsp. naso (Forest Red-tailed Black Cockatoo)*		T	
5.	24734	*Calyptorhynchus latirostris (Carnaby's Cockatoo, White-tailed Short-billed Black Cockatoo)*		T	
6.	48400	*Calyptorhynchus sp. (white-tailed black cockatoo)*		T	
7.	25335	*Caretta caretta (Loggerhead Turtle)*		T	
8.	25575	*Charadrius leschenaultii (Greater Sand Plover)*		T	
9.	24092	*Dasyurus geoffroii (Chuditch, Western Quoll)*		T	
10.	10796	*Diuris drummondii (Tall Donkey Orchid)*		T	
11.	1639	*Drakaea elastica (Glossy-leaved Hammer Orchid)*		T	
Protected under international agreement					
12.	41323	*Actitis hypoleucos (Common Sandpiper)*		IA	
13.	25736	*Arenaria interpres (Ruddy Turnstone)*		IA	
14.	24779	*Calidris acuminata (Sharp-tailed Sandpiper)*		IA	
15.	24780	*Calidris alba (Sanderling)*		IA	
16.	24786	*Calidris melanotos (Pectoral Sandpiper)*		IA	
17.	24788	*Calidris ruficollis (Red-necked Stint)*		IA	
18.	24789	*Calidris subminuta (Long-toed Stint)*		IA	
19.	24481	*Glareola maldivarum (Oriental Pratincole)*		IA	
20.	48587	*Hydroprogne caspia (Caspian Tern)*		IA	
21.	30932	*Limosa lapponica (Bar-tailed Godwit)*		IA	
22.	24690	*Macronectes giganteus (Southern Giant Petrel)*		IA	
23.	25742	*Numenius phaeopus (Whimbrel)*		IA	
24.	48591	*Pandion cristatus (Osprey, Eastern Osprey)*		IA	
25.	24802	*Philomachus pugnax (Ruff, reeve)*		IA	
26.	24843	*Plegadis falcinellus (Glossy Ibis)*		IA	
27.	24382	*Pluvialis fulva (Pacific Golden Plover)*		IA	
28.	24383	*Pluvialis squatarola (Grey Plover)*		IA	
29.	24716	*Puffinus pacificus (Wedge-tailed Shearwater)*		IA	
30.	48593	*Sternula albifrons (Little Tern)*		IA	
31.	48597	*Thalasseus bergii (Crested Tern)*		IA	
32.	24806	*Tringa glareola (Wood Sandpiper)*		IA	
33.	24808	*Tringa nebularia (Common Greenshank, greenshank)*		IA	
Other specially protected fauna					
34.	25624	*Falco peregrinus (Peregrine Falcon)*		S	
35.	48070	*Phascogale tapoatafa subsp. wambenger (South-western Brush-tailed Phascogale, Wambenger)*		S	

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
Priority 2					
36.	3237	*Acacia benthamii*		P2	
37.	3006	*Cardamine paucijuga*		P2	
Priority 3					
38.	34236	*Beyeria cinerea subsp. cinerea*		P3	
39.	44226	*Calandrinia oraria*		P3	
40.	3863	*Dillwynia dillwynioides*		P3	
41.	48935	*Idiosoma sigillatum (Swan Coastal Plain shield-backed trapdoor spider)*		P3	
42.	5038	*Lasiopetalum membranaceum*		P3	
43.	25147	*Lerista lineata (Perth Slider, Lined Skink)*		P3	
44.	25249	*Neelaps calonotos (Black-striped Snake, black-striped burrowing snake)*		P3	
45.	5237	*Pimelea calcicola*		P3	
46.	980	*Schoenus capillifolius*		P3	
47.	20348	*Sphaerolobium calcicola*		P3	
Priority 4					
48.	13862	*Caladenia speciosa*		P4	
49.	11657	*Conostylis pauciflora subsp. pauciflora*		P4	
50.	48588	*Isoodon fusciventer (Quenda, southwestern brown bandicoot)*		P4	
51.	4027	*Jacksonia sericea (Waldjumi)*		P4	
52.	24328	*Oxyura australis (Blue-billed Duck)*		P4	
53.	6573	*Parsonsia diaphanophleba*		P4	
54.	7756	*Stylidium longitubum (Jumping Jacks)*		P4	
55.	33992	*Synemon gratiosa (Graceful Sunmoth)*		P4	
Non-conservation taxon					
56.	15466	*Acacia applanata*			
57.	3262	*Acacia cochlearis (Rigid Wattle)*			
58.	3282	*Acacia cyclops (Coastal Wattle)*			
59.	3374	*Acacia huegelii*			
60.	3409	*Acacia lasiocarpa (Panjang)*			
61.	11611	*Acacia lasiocarpa var. lasiocarpa*			
62.	3502	*Acacia pulchella (Prickly Moses)*			
63.	15481	*Acacia pulchella var. glaberrima*			
64.	3525	*Acacia rostellifera (Summer-scented Wattle)*			
65.	3527	*Acacia saligna (Orange Wattle, Kudjong)*			
66.	30033	*Acacia saligna subsp. lindleyi*			
67.	30032	*Acacia saligna subsp. saligna*			
68.	3557	*Acacia stenoptera (Narrow Winged Wattle)*			
69.	3584	*Acacia truncata*			
70.	3602	*Acacia willdenowiana (Grass Wattle)*			
71.	24260	*Acanthiza apicalis (Broad-tailed Thornbill, Inland Thornbill)*			
72.	24261	*Acanthiza chrysorrhoa (Yellow-rumped Thornbill)*			
73.	24262	*Acanthiza inornata (Western Thornbill)*			
74.	1208	*Acanthocarpus preissii*			
75.	24560	*Acanthorhynchus superciliosus (Western Spinebill)*			
76.	25535	*Accipiter cirrocephalus (Collared Sparrowhawk)*			
77.	25536	*Accipiter fasciatus (Brown Goshawk)*			
78.	42368	*Acritoscincus trilineatus (Western Three-lined Skink)*			
79.	25755	*Acrocephalus australis (Australian Reed Warbler)*			
80.	6295	*Acrotriche cordata (Coast Ground Berry)*			
81.	1790	*Adenanthos meisneri*			
82.	4582	*Adriana quadripartita (Bitter Bush)*			
83.		*Afurcagobius suppositus*			
84.	17202	*Agonis flexuosa var. flexuosa*			
85.	184	*Aira caryophyllea (Silvery Hairgrass)*	Y		
86.	1728	*Allocasuarina fraseriana (Sheoak, Kondil)*			
87.	1732	*Allocasuarina humilis (Dwarf Sheoak)*			
88.	6565	*Alyxia buxifolia (Dysentery Bush)*			
89.	35159	*Ammophila arenaria subsp. arenaria*	Y		
90.	13101	*Amperea simulans*			
91.		*Aname mainae*			
92.		*Aname tepperi*			
93.	24310	*Anas castanea (Chestnut Teal)*			
94.	24312	*Anas gracilis (Grey Teal)*			
95.	24313	*Anas platyrhynchos (Mallard)*			
96.	24315	*Anas rhynchotis (Australasian Shoveler)*			
97.	24316	*Anas superciliosa (Pacific Black Duck)*			
98.	47414	*Anhinga novaehollandiae (Australasian Darter)*			
99.	1409	*Anigozanthos humilis (Catspaw)*			
100.	11434	*Anigozanthos humilis subsp. humilis*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
101.	1411	*Anigozanthos manglesii (Mangles Kangaroo Paw, Kurulbrang)*			
102.	11566	*Anigozanthos viridis subsp. viridis*			
103.	44629	*Anilios australis*			
104.	11725	*Anthocercis ilicifolia subsp. ilicifolia*			
105.	6949	*Anthocercis littorea (Yellow Tailflower)*			
106.	24561	*Anthochaera carunculata (Red Wattlebird)*			
107.	24562	*Anthochaera lunulata (Western Little Wattlebird)*			
108.	12724	*Anthotium junciforme*			
109.	202	*Anthoxanthum odoratum (Sweet Vernal Grass)*	Y		
110.	25670	*Anthus australis (Australian Pipit)*			
111.	3688	*Aotus gracillima*			
112.	3692	*Aotus procumbens*			
113.	1117	*Aphelia cyperoides*			
114.	6210	*Apium annuum*			
115.	6211	*Apium prostratum (Sea Celery)*			
116.	12040	*Apium prostratum subsp. prostratum var. prostratum (Sea Celery)*			
117.	24991	*Aprasia repens (Sand-plain Worm-lizard)*			
118.	24285	*Aquila audax (Wedge-tailed Eagle)*			
119.	7838	*Arctotheca calendula (Cape Weed, African Marigold)*	Y		
120.	7840	*Arctotis stoechadifolia (White Arctotis, Silver Arctotis)*	Y		
121.	41324	*Ardea modesta (great egret, white egret)*			
122.	24340	*Ardea novaehollandiae (White-faced Heron)*			
123.	24341	*Ardea pacifica (White-necked Heron)*			
124.		*Armillaria luteobubalina*			
125.	1264	*Arnocrinum preissii*			
126.	25566	*Artamus cinereus (Black-faced Woodswallow)*			
127.	24353	*Artamus cyanopterus (Dusky Woodswallow)*			
128.	6580	*Asclepias curassavica (Redhead Cottonbush)*	Y		
129.	8779	*Asparagus asparagoides (Bridal Creeper)*	Y		
130.	1364	*Asphodelus fistulosus (Onion Weed)*	Y		
131.	20350	*Astartea affinis (West-coast Astartea)*			
132.	20283	*Astartea scoparia (Common Astartea)*			
133.	7851	*Asteridea pulverulenta (Common Bristle Daisy)*			
134.	6323	*Astroloma ciliatum (Candle Cranberry)*			
135.	6334	*Astroloma pallidum (Kick Bush)*			
136.	2471	*Atriplex prostrata (Hastate Orache)*	Y		
137.	2480	*Atriplex suberecta*			
138.	38762	*Auriscalpium barbatum*			
139.	47713	*Austronomus australis (White-striped Free-tailed Bat)*			
140.	17234	*Austrostipa compressa*			
141.	17239	*Austrostipa exilis*			
142.	17240	*Austrostipa flavescens*			
143.	233	*Avena barbata (Bearded Oat)*	Y		
144.	24318	*Aythya australis (Hardhead)*			
145.	1800	*Banksia attenuata (Slender Banksia, Piara)*			
146.	32580	*Banksia dallanneyi subsp. dallanneyi var. dallanneyi*			
147.	1819	*Banksia grandis (Bull Banksia, Pulgarla)*			
148.	1830	*Banksia littoralis (Swamp Banksia, Pungura)*			
149.	1834	*Banksia menziesii (Firewood Banksia)*			
150.	32202	*Banksia nivea (Honeypot Dryandra, Pudjarn)*			
151.		*Barnardius zonarius*			
152.	741	*Baumea articulata (Jointed Rush)*			
153.	743	*Baumea juncea (Bare Twigrush)*			
154.	744	*Baumea laxa*			
155.	748	*Baumea vaginalis (Sheath Twigrush)*			
156.	7046	*Bellardia trixago (Bellardia)*	Y		
157.	48868	*Bellardia viscosa*	Y		
158.	24319	*Biziura lobata (Musk Duck)*			
159.	749	*Bolboschoenus caldwellii (Marsh Club-rush)*			
160.		*Boletus sp.*			
161.	3710	*Bossiaea eriocarpa (Common Brown Pea)*			
162.	6341	*Brachyloma preissii (Globe Heath)*			
163.	8661	*Brachypodium distachyon (False Brome)*	Y		
164.	7878	*Brachyscome iberidifolia*			
165.	244	*Briza maxima (Blowfly Grass)*	Y		
166.	245	*Briza minor (Shivery Grass)*	Y		
167.	247	*Bromus arenarius (Sand Brome)*			
168.	249	*Bromus diandrus (Great Brome)*	Y		
169.	1383	*Burchardia bairdiae*			
170.	12770	*Burchardia congesta*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
171.	1385	*Burchardia multiflora (Dwarf Burchardia)*			
172.	25714	*Cacatua pastinator (Western Long-billed Corella)*			
173.	25715	*Cacatua roseicapilla (Galah)*			
174.	25716	*Cacatua sanguinea (Little Corella)*			
175.	24729	*Cacatua tenuirostris (Eastern Long-billed Corella)*	Y		
176.	25598	*Cacomantis flabelliformis (Fan-tailed Cuckoo)*			
177.	1276	*Caesia micrantha (Pale Grass Lily)*			
178.	3002	*Cakile maritima (Sea Rocket)*	Y		
179.	15330	*Caladenia arenicola*			
180.	1592	*Caladenia flava (Cowslip Orchid)*			
181.	1599	*Caladenia latifolia (Pink Fairy Orchid)*			
182.	15361	*Caladenia longicauda subsp. calcigena*			
183.	17589	*Caladenia occidentalis*			
184.	18019	*Caladenia vulgata*			
185.	2845	*Calandrinia brevipedata (Short-stalked Purslane)*			
186.	2848	*Calandrinia corrigioloides (Strap Purslane)*			
187.	2854	*Calandrinia granulifera (Pygmy Purslane)*			
188.	2856	*Calandrinia liniflora (Parakeelya)*			
189.	40827	*Calandrinia tholiformis*			
190.	25717	*Calyptorhynchus banksii (Red-tailed Black-Cockatoo)*			
191.		*Calyptorhynchus latirostris?*			Y
192.	5439	*Calytrix angulata (Yellow Starflower)*			
193.	5458	*Calytrix flavescens (Summer Starflower)*			
194.		*Candelariella sp.*			
195.	48920	*Canis familiaris (Dog, Dingo)*	Y		
196.	3005	*Cardamine hirsuta (Common Bittercress)*	Y		
197.	25625	*Carduelis carduelis (Goldfinch, European Goldfinch)*	Y		
198.	43241	*Carex thecata*			
199.	2798	*Carpobrotus virescens (Coastal Pigface, Kolboko, Bain)*			
200.	1162	*Cartonema philydroides*			
201.	2951	*Cassytha flava (Dodder Laurel)*			
202.	2957	*Cassytha racemosa (Dodder Laurel)*			
203.	11799	*Cassytha racemosa forma racemosa*			
204.	259	*Cenchrus echinatus (Burrgrass)*	Y		
205.	7916	*Centaurea melitensis (Maltese Cockspur, Malta Thistle)*	Y		
206.	6542	*Centaurium tenuiflorum*	Y		
207.	6214	*Centella asiatica*			
208.	35322	*Centranthus ruber subsp. ruber*	Y		
209.	1120	*Centrolepis alepyroides*			
210.	1121	*Centrolepis aristata (Pointed Centrolepis)*			
211.	2889	*Cerastium glomeratum (Mouse Ear Chickweed)*	Y		
212.	24186	*Chalinolobus gouldii (Gould's Wattled Bat)*			
213.	1280	*Chamaescilla corymbosa (Blue Squill)*			
214.	24377	*Charadrius ruficapillus (Red-capped Plover)*			
215.	43380	*Chelodina colliei (South-western Snake-necked Turtle)*			
216.	24321	*Chenonetta jubata (Australian Wood Duck, Wood Duck)*			
217.	2490	*Chenopodium glaucum (Glaucous Goosefoot)*	Y		
218.		*Cherax destructor*			
219.		*Cherax quinquecarinatus*			
220.	267	*Chloris gayana (Rhodes Grass)*	Y		
221.	763	*Chorizandra enodis (Black Bristlerush)*			
222.	24980	*Christinus marmoratus (Marbled Gecko)*			
223.		*Chroicocephalus novaehollandiae*			
224.	24431	*Chrysococcyx basalis (Horsfield's Bronze Cuckoo)*			
225.	24288	*Circus approximans (Swamp Harrier)*			
226.	24289	*Circus assimilis (Spotted Harrier)*			
227.	24774	*Cladorhynchus leucocephalus (Banded Stilt)*			
228.	10804	*Clematis linearifolia*			
229.	25675	*Colluricincla harmonica (Grey Shrike-thrush)*			
230.	24399	*Columba livia (Domestic Pigeon)*	Y		
231.	4550	*Comesperma calymega (Blue-spike Milkwort)*			
232.	4552	*Comesperma confertum*			
233.	4555	*Comesperma integerrimum*			
234.	4564	*Comesperma virgatum (Milkwort)*			
235.	16853	*Conospermum capitatum subsp. glabratum*			
236.	1885	*Conospermum triplinervium (Tree Smokebush)*			
237.	6349	*Conostephium preissii*			
238.	1418	*Conostylis aculeata (Prickly Conostylis)*			
239.	11826	*Conostylis aculeata subsp. aculeata*			
240.	1427	*Conostylis candicans (Grey Cottonhead)*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
241.	12027	*Conostylis candicans subsp. calcicola*			
242.	1436	*Conostylis juncea*			
243.	1443	*Conostylis pauciflora (Dawesville Conostylis)*			
244.	25568	*Coracina novaehollandiae (Black-faced Cuckoo-shrike)*			
245.	25592	*Corvus coronoides (Australian Raven)*			
246.	1285	*Corynotheca micrantha (Sand Lily)*			
247.	7945	*Cotula coronopifolia (Waterbuttons)*	Y		
248.	24671	*Coturnix pectoralis (Stubble Quail)*			
249.	25595	*Cracticus tibicen (Australian Magpie)*			
250.	25596	*Cracticus torquatus (Grey Butcherbird)*			
251.		*Crapatalus sp.*			Y
252.	42009	*Craspedia sp. Yalgorup National Park (G.J. Keighery 14449)*			
253.	3137	*Crassula colorata (Dense Stonecrop)*			
254.	11709	*Crassula colorata var. acuminata*			
255.	11563	*Crassula colorata var. colorata*			
256.	3140	*Crassula glomerata*	Y		
257.	15706	*Crassula natans var. minus*	Y		
258.	25399	*Crinia glauerti (Clicking Frog)*			
259.	25400	*Crinia insignifera (Squelching Froglet)*			
260.	4802	*Cryptandra mutila*			
261.	30893	*Cryptoblepharus buchananii*			
262.	30899	*Ctenophorus adelaidensis (Southern Heath Dragon, Western Heath Dragon)*			
263.	25027	*Ctenotus australis*			
264.	25039	*Ctenotus fallens*			
265.	6663	*Cuscuta epithymum (Lesser Dodder, Greater Dodder)*	Y		
266.	11021	*Cuscuta planiflora*	Y		
267.	768	*Cyathochaeta avenacea*			
268.	40661	*Cycnogeton lineare*			
269.	24322	*Cygnus atratus (Black Swan)*			
270.	19625	*Cymbalaria muralis subsp. muralis*	Y		
271.	285	*Cynosurus echinatus (Rough Dogstail)*	Y		
272.	783	*Cyperus congestus (Dense Flat-sedge)*	Y		
273.	816	*Cyperus tenuiflorus (Scaly Sedge)*	Y		
274.	10916	*Cyrtostylis huegelii*			
275.	30901	*Dacelo novaeguineae (Laughing Kookaburra)*	Y		
276.	7454	*Dampiera linearis (Common Dampiera)*			
277.	7484	*Dampiera trigona (Angled-stem Dampiera)*			
278.	25673	*Daphoenositta chrysoptera (Varied Sittella)*			
279.	5518	*Darwinia neildiana (Fringed Bell)*			
280.	1218	*Dasypogon bromeliifolius (Pineapple Bush)*			
281.	6218	*Daucus glochidiatus (Australian Carrot)*			
282.	15505	*Daviesia incrassata subsp. incrassata*			
283.	3832	*Daviesia physodes*			
284.	3845	*Daviesia triflora*			
285.	25766	*Delma fraseri (Fraser's Legless Lizard)*			
286.	24999	*Delma grayii*			
287.	25468	*Demansia psammophis (Yellow-faced Whipsnake)*			
288.	25296	*Demansia psammophis subsp. reticulata (Yellow-faced Whipsnake)*			
289.	17663	*Desmocladus asper*			
290.	17691	*Desmocladus fasciculatus*			
291.	16595	*Desmocladus flexuosus*			
292.	299	*Deyeuxia quadriseta (Reed Bentgrass)*			
293.	25607	*Dicaeum hirundinaceum (Mistletoebird)*			
294.	306	*Dichelachne crinita (Longhair Plumegrass)*			
295.	1287	*Dichopogon capillipes*			
296.	4454	*Diplolaena dampieri (Southern Diplolaena)*			
297.	18541	*Diplopeltis huegelii subsp. huegelii*			
298.	7054	*Dischisma arenarium*	Y		
299.	7055	*Dischisma capitatum (Woolly-headed Dischisma)*	Y		
300.	1635	*Diuris longifolia (Common Donkey Orchid)*			
301.	24470	*Dromaius novaehollandiae (Emu)*			
302.	3095	*Drosera erythrorhiza (Red Ink Sundew)*			
303.	3097	*Drosera gigantea (Giant Sundew)*			
304.	3098	*Drosera glanduligera (Pimpernel Sundew)*			
305.	3109	*Drosera menziesii (Pink Rainbow)*			
306.	3113	*Drosera neesii (Jewel Rainbow)*			
307.	3114	*Drosera nitidula (Shining Sundew)*			
308.	3118	*Drosera pallida (Pale Rainbow)*			
309.	49090	*Drosera sp. Branched styles (S.C. Coffey 193)*			
310.	3131	*Drosera stolonifera (Leafy Sundew)*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
311.	13205	*Drosera tubaestylis*			
312.	25096	*Egernia kingii (King's Skink)*			
313.	25100	*Egernia napoleonis*			
314.		*Egretta garzetta*			
315.		*Egretta novaehollandiae*			
316.	347	*Ehrharta calycina (Perennial Veldt Grass)*	Y		
317.		*Elanus axillaris*			
318.	25540	*Elanus caeruleus (Black-shouldered Kite)*			
319.	24290	*Elanus caeruleus subsp. axillaris (Australian Black-shouldered Kite)*			
320.	47937	*Elseyornis melanops (Black-fronted Dotterel)*			
321.		*Eolophus roseicapillus*			
322.	6131	*Epilobium billardiereanum (Glabrous Willow Herb)*			
323.	6133	*Epilobium hirtigerum (Hairy Willow Herb)*			
324.	14289	*Epilobium tetragonum subsp. tetragonum*	Y		
325.	24567	*Epthianura albifrons (White-fronted Chat)*			
326.	17175	*Eremophila glabra subsp. albicans*			
327.	15410	*Eriochilus dilatatus subsp. dilatatus*			
328.	15412	*Eriochilus dilatatus subsp. multiflorus*			
329.	4332	*Erodium botrys (Long Storksbill)*	Y		
330.	4333	*Erodium cicutarium (Common Storksbill)*	Y		
331.	15446	*Eryngium pinnatifidum subsp. pinnatifidum*			
332.	24379	*Erythrogonys cinctus (Red-kneed Dotterel)*			
333.	5649	*Eucalyptus foecunda (Narrow-leaved Red Mallee)*			
334.	5659	*Eucalyptus gomphocephala (Tuart, Duart)*			
335.	5708	*Eucalyptus marginata (Jarrah, Djara)*			
336.	13547	*Eucalyptus marginata subsp. marginata (Jarrah)*			
337.	20808	*Eucalyptus petiolaris*	Y		
338.	5763	*Eucalyptus rudis (Flooded Gum, Kulurda)*			
339.	13511	*Eucalyptus rudis subsp. rudis*			
340.	4636	*Euphorbia paralias (Sea Spurge)*	Y		
341.	4648	*Euphorbia terracina (Geraldton Carnation Weed)*	Y		
342.	3880	*Eutaxia virgata*			
343.	10765	*Exocarpos sparteus (Broom Ballart, Djuk)*			
344.	25621	*Falco berigora (Brown Falcon)*			
345.	25622	*Falco cenchroides (Australian Kestrel, Nankeen Kestrel)*			
346.	25623	*Falco longipennis (Australian Hobby)*			
347.	24041	*Felis catus (Cat)*	Y		
348.	20216	*Ficinia nodosa (Knotted Club Rush)*			
349.	25727	*Fulica atra (Eurasian Coot)*			
350.	24761	*Fulica atra subsp. australis (Eurasian Coot)*			
351.	907	*Gahnia trifida (Coast Saw-sedge)*			
352.	34028	*Galaxias occidentalis (Western Minnow)*			
353.	25729	*Gallinula tenebrosa (Dusky Moorhen)*			
354.	24763	*Gallinula tenebrosa subsp. tenebrosa (Dusky Moorhen)*			
355.	20473	*Gastrolobium ebracteolatum*			
356.	20482	*Gastrolobium nervosum*			
357.	4339	*Geranium molle (Dove's Foot Cranesbill)*	Y		
358.	4340	*Geranium retrorsum*			
359.	4341	*Geranium solanderi (Native Geranium)*			
360.	25530	*Gerygone fusca (Western Gerygone)*			
361.	1520	*Gladiolus caryophyllaceus (Wild Gladiolus)*	Y		
362.	24054	*Globicephala macrorhynchus (Short-finned Pilot Whale)*			
363.	10909	*Gompholobium confertum*			
364.	3957	*Gompholobium tomentosum (Hairy Yellow Pea)*			
365.	7538	*Goodenia pulchella*			
366.	24443	*Grallina cyanoleuca (Magpie-lark)*			
367.	1982	*Grevillea crithmifolia*			
368.	15839	*Grevillea preissii subsp. preissii*			
369.	12824	*Grevillea vestita subsp. vestita*			
370.		*Gymnopilus allantopus*			
371.		*Gymnothorax prasinus*			
372.	24487	*Haematopus longirostris (Pied Oystercatcher)*			
373.	1468	*Haemodorum laxum*			
374.	1472	*Haemodorum simplex*			
375.	2197	*Hakea prostrata (Harsh Hakea)*			
376.	2216	*Hakea varia (Variable-leaved Hakea)*			
377.	24293	*Haliaeetus leucogaster (White-bellied Sea-Eagle)*			
378.	24295	*Haliastur sphenurus (Whistling Kite)*			
379.	24689	*Halobaena caerulea (Blue Petrel)*			
380.	3961	*Hardenbergia comptoniana (Native Wisteria)*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
381.	25410	*Heleioporus eyrei (Moaning Frog)*			
382.	25412	*Heleioporus psammophilus (Sand Frog)*			
383.	3016	*Heliophila pusilla*	Y		
384.	16933	*Hemiandra glabra*			
385.	6839	*Hemiandra pungens (Snakebush)*			
386.	25232	*Hemidactylus frenatus (Asian House Gecko)*	Y		
387.	25119	*Hemiergis quadrilineata*			
388.	5117	*Hibbertia cuneiformis (Cutleaf Hibbertia)*			
389.	5135	*Hibbertia hypericoides (Yellow Buttercups)*			
390.	45534	*Hibbertia hypericoides subsp. hypericoides*			
391.	5162	*Hibbertia racemosa (Stalked Guinea Flower)*			
392.	5172	*Hibbertia stellaris (Orange Stars)*			
393.	5176	*Hibbertia vaginata*			
394.	47965	*Hieraaetus morphnoides (Little Eagle)*			
395.	25734	*Himantopus himantopus (Black-winged Stilt)*			
396.	24491	*Hirundo neoxena (Welcome Swallow)*			
397.	13758	*Histiopteris incisa*			
398.	445	*Holcus setiger (Annual Fog)*	Y		
399.	6222	*Homalosciadium homalocarpum*			
400.	3968	*Hovea trisperma (Common Hovea)*			
401.	12859	*Hovea trisperma var. trisperma*			
402.	5216	*Hybanthus calycinus (Wild Violet)*			
403.	6229	*Hydrocotyle diantha*			
404.	11546	*Hydrocotyle pilifera var. glabrata*			
405.	6241	*Hydrocotyle tetragonocarpa*			
406.	25366	*Hydrophis elegans (Elegant Seasnake, Bar-bellied Seasnake)*			
407.	452	*Hyparrhenia hirta (Tambookie Grass)*	Y		
408.	35070	*Hypocalymma angustifolium subsp. Swan Coastal Plain (G.J. Keighery 16777)*			
409.	8086	*Hypochaeris glabra (Smooth Catsear)*	Y		
410.	1070	*Hypolaena exsulca*			
411.	17841	*Hypolaena pubescens*			
412.		*Idiommata blackwalli*			
413.	48504	*Inocybe acaciae*			
414.	48545	*Inocybe sabulosa*			
415.	910	*Isolepis cernua (Nodding Club-rush)*			
416.	20200	*Isolepis cernua var. setiformis*			
417.	917	*Isolepis marginata (Coarse Club-rush)*			
418.	921	*Isolepis producta*			
419.		*Isopeda leishmanni*			
420.	3992	*Isotropis cuneifolia (Granny Bonnets)*			
421.	19700	*Isotropis cuneifolia subsp. cuneifolia*			
422.	8092	*Ixiolaena viscosa (Sticky Ixiolaena)*			
423.	4012	*Jacksonia furcellata (Grey Stinkwood)*			
424.	20454	*Juncus acutus subsp. acutus*	Y		
425.	1178	*Juncus bufonius (Toad Rush)*	Y		
426.	1185	*Juncus kraussii (Sea Rush)*			
427.	11922	*Juncus kraussii subsp. australiensis*			
428.	1188	*Juncus pallidus (Pale Rush)*			
429.	4044	*Kennedia prostrata (Scarlet Runner)*			
430.	5832	*Kunzea ericifolia (Spearwood, Pondil)*			
431.	15498	*Kunzea glabrescens (Spearwood)*			
432.	13562	*Lachenalia aloides*	Y		
433.	20019	*Lachnagrostis filiformis*			
434.	467	*Lagurus ovatus (Hare's Tail Grass)*	Y		
435.	25637	*Larus novaehollandiae (Silver Gull)*			
436.	1309	*Laxmannia squarrosa*			
437.	7572	*Lechenaultia expansa*			
438.	44490	*Leontodon rhagadioloides*	Y		
439.	925	*Lepidosperma angustatum*			
440.	42742	*Lepidosperma calcicola*			
441.	932	*Lepidosperma effusum (Spreading Sword-sedge)*			
442.	933	*Lepidosperma gladiatum (Coast Sword-sedge, Kerbin)*			
443.	937	*Lepidosperma longitudinale (Pithy Sword-sedge)*			
444.	940	*Lepidosperma pubisquameum*			
445.		*Lepidosperma sp.*			
446.	945	*Lepidosperma squamatum*			
447.	1653	*Leporella fimbriata (Hare Orchid)*			
448.	1078	*Leptocarpus coangustatus*			
449.	46375	*Leptocarpus decipiens*			
450.	46382	*Leptocarpus roycei*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
451.	1080	*Leptocarpus scariosus*			
452.	15418	*Leptoceras menziesii*			
453.	2344	*Leptomeria empetriformis*			
454.	2352	*Leptomeria preissiana*			
455.	17852	*Leptorhynchos scaber (Lanky Buttons)*			
456.	5850	*Leptospermum laevigatum (Coast Teatree)*	Y		
457.	1085	*Lepyrodia glauca*			
458.	1088	*Lepyrodia macra (Large Scale Rush)*			
459.	1090	*Lepyrodia muirii*			
460.	25133	*Lerista elegans*			
461.	6360	*Leucopogon australis (Spiked Beard-heath)*			
462.	6427	*Leucopogon parviflorus (Coast Beard-heath)*			
463.	6436	*Leucopogon propinquus*			
464.	7677	*Levenhookia stipitata (Common Stylewort)*			
465.	25005	*Lialis burtonis*			
466.	25661	*Lichmera indistincta (Brown Honeyeater)*			
467.	24582	*Lichmera indistincta subsp. indistincta (Brown Honeyeater)*			
468.	25415	*Limnodynastes dorsalis (Western Banjo Frog)*			
469.	7075	*Linaria maroccana*	Y		
470.	36160	*Liparophyllum capitatum*			
471.	36179	*Liparophyllum violifolium*			
472.	25378	*Litoria adelaidensis (Slender Tree Frog)*			
473.	25388	*Litoria moorei (Motorbike Frog)*			
474.	9289	*Lobelia anceps (Angled Lobelia)*			
475.	7408	*Lobelia tenuior (Slender Lobelia)*			
476.	6515	*Logania vaginalis (White Spray)*			
477.	476	*Lolium perenne (Perennial Ryegrass)*	Y		
478.	478	*Lolium rigidum (Wimmera Ryegrass)*	Y		
479.		*Lolium sp.*			
480.	11073	*Lolium x hybridum*	Y		
481.	1223	*Lomandra caespitosa (Tufted Mat Rush)*			
482.	1228	*Lomandra hermaphrodita*			
483.	1231	*Lomandra maritima*			
484.	1232	*Lomandra micrantha (Small-flower Mat-rush)*			
485.	14542	*Lomandra micrantha subsp. micrantha*			
486.	1239	*Lomandra preissii*			
487.	1243	*Lomandra sericea (Silky Mat Rush)*			
488.	1246	*Lomandra suaveolens*			
489.		*Lophoictinia isura*			
490.	8564	*Lotus subbiflorus*	Y		
491.	1198	*Luzula meridionalis (Field Woodrush)*			
492.	1097	*Lyginia barbata*			
493.	18049	*Lyginia imberbis*			
494.	36375	*Lysimachia arvensis (Pimpernel)*	Y		
495.	2839	*Macarthuria australis*			
496.		*Macrolepiota clelandii*			
497.	24132	*Macropus fuliginosus (Western Grey Kangaroo)*			
498.	85	*Macrozamia riedlei (Zamia, Djiridji)*			
499.	24326	*Malacorhynchus membranaceus (Pink-eared Duck)*			
500.	25654	*Malurus splendens (Splendid Fairy-wren)*			
501.	24552	*Malurus splendens subsp. splendens (Splendid Fairy-wren)*			
502.	4961	*Malva parviflora (Marshmallow)*	Y		
503.	36522	*Malva pseudolavatera*	Y		
504.	4079	*Medicago polymorpha (Burr Medic)*	Y		
505.	4080	*Medicago sativa (Alfalfa)*	Y		
506.	25758	*Megalurus gramineus (Little Grassbird)*			
507.	34676	*Meionectes brownii (Swamp Raspwort)*			
508.	5921	*Melaleuca incana (Grey Honeymyrtle)*			
509.	13273	*Melaleuca incana subsp. incana*			
510.	5926	*Melaleuca lateritia (Robin Redbreast Bush)*			
511.	5952	*Melaleuca preissiana (Moonah)*			
512.	5959	*Melaleuca rhaphiophylla (Swamp Paperbark)*			
513.	18598	*Melaleuca systena*			
514.	5978	*Melaleuca teretifolia (Banbar)*			
515.	5980	*Melaleuca thymoides*			
516.	5987	*Melaleuca viminea (Mohan)*			
517.	13280	*Melaleuca viminea subsp. viminea*			
518.	4085	*Melilotus indicus*	Y		
519.	25184	*Menetia greyii*			
520.	6886	*Mentha x piperita*	Y		Y

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
521.	24598	*Merops ornatus (Rainbow Bee-eater)*			
522.	955	*Mesomelaena pseudostygia*			
523.	957	*Mesomelaena tetragona (Semaphore Sedge)*			
524.		*Microcarbo melanoleucos*			
525.	25693	*Microeca fascinans (Jacky Winter)*			
526.	485	*Microlaena stipoides (Weeping Grass)*			
527.	15419	*Microtis media subsp. media*			
528.	1660	*Microtis orbicularis (Dark Mignonette Orchid)*			
529.	8105	*Millotia myosotidifolia*			
530.	16693	*Minuartia mediterranea*	Y		
531.		*Missulena granulosa*			
532.		*Missulena hoggi*			
533.	37440	*Monopsis debilis var. depressa*	Y		
534.	25240	*Morelia spilota subsp. imbricata (Carpet Python)*			
535.	25191	*Morethia lineoocellata*			
536.	48008	*Morus serrator (Australasian Gannet)*			
537.	2412	*Muehlenbeckia adpressa (Climbing Lignum)*			
538.	24223	*Mus musculus (House Mouse)*	Y		
539.	38811	*Mycena clarkeana*			
540.		*Mycena nargan*			
541.	7289	*Myoporum caprarioides (Slender Myoporum)*			
542.		*Nannoperca vittata*			
543.	24738	*Neophema elegans (Elegant Parrot)*			
544.		*Nicodamus mainae*			
545.	25252	*Notechis scutatus (Tiger Snake)*			
546.	2401	*Nuytsia floribunda (Christmas Tree, Mudja)*			
547.	25564	*Nycticorax caledonicus (Rufous Night Heron)*			
548.	24407	*Ocyphaps lophotes (Crested Pigeon)*			
549.	16390	*Oenothera drummondii subsp. drummondii*	Y		
550.	35416	*Oenothera lindheimeri*	Y		
551.	8127	*Olearia axillaris (Coastal Daisybush)*			
552.	38816	*Omphalotus nidiformis*			
553.	7348	*Opercularia hispidula (Hispid Stinkweed)*			
554.	18255	*Opercularia vaginata (Dog Weed)*			
555.	4113	*Ornithopus compressus (Yellow Serradella)*	Y		
556.	7122	*Orobanche minor (Lesser Broomrape)*	Y		
557.	24085	*Oryctolagus cuniculus (Rabbit)*	Y		
558.	30375	*Oxalis exilis*			
559.	4355	*Oxalis perennans*			
560.	25680	*Pachycephala rufiventris (Rufous Whistler)*			
561.	24693	*Pachyptila desolata (Antarctic Prion)*			
562.	1667	*Paracaleana nigrita (Flying Duck Orchid)*			
563.	25253	*Parasuta gouldii*			
564.	25681	*Pardalotus punctatus (Spotted Pardalote)*			
565.	25682	*Pardalotus striatus (Striated Pardalote)*			
566.	7089	*Parentucellia latifolia (Common Bartsia)*	Y		
567.	1763	*Parietaria judaica (Pellitory)*	Y		
568.	1550	*Patersonia occidentalis (Purple Flag, Koma)*			
569.	4343	*Pelargonium capitatum (Rose Pelargonium)*	Y		
570.	4346	*Pelargonium littorale*			
571.	24648	*Pelecanus conspicillatus (Australian Pelican)*			
572.	6006	*Pericalymma ellipticum (Swamp Teatree)*			
573.	16478	*Pericalymma ellipticum var. floridum*			
574.	48061	*Petrochelidon nigricans (Tree Martin)*			
575.	48066	*Petroica boodang (Scarlet Robin)*			
576.	20368	*Petrophile axillaris*			
577.	2299	*Petrophile linearis (Pixie Mops)*			
578.	19825	*Petrorhagia dubia*	Y		
579.	25697	*Phalacrocorax carbo (Great Cormorant)*			
580.	25698	*Phalacrocorax melanoleucos (Little Pied Cormorant)*			
581.	24667	*Phalacrocorax sulcirostris (Little Black Cormorant)*			
582.	25699	*Phalacrocorax varius (Pied Cormorant)*			
583.	548	*Phalaris aquatica (Phalaris)*	Y		
584.	24409	*Phaps chalcoptera (Common Bronzewing)*			
585.	20460	*Pheladenia deformis*			
586.	18529	*Philotheca spicata (Pepper and Salt)*			
587.	1478	*Phlebocarya ciliata*			
588.	48071	*Phylidonyris niger (White-cheeked Honeyeater)*			
589.	24596	*Phylidonyris novaehollandiae (New Holland Honeyeater)*			
590.	16177	*Phyllangium paradoxum*			

Appendix 5

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591.	4675	*Phyllanthus calycinus (False Boronia)*			
592.		*Phyllichthys punctatus*			
593.	4	*Phylloglossum drummondii (Pigmy Clubmoss)*			
594.		*Phytophthora cinnamomi*			
595.	14370	*Picris angustifolia subsp. angustifolia*			
596.	5252	*Pimelea lanata*			
597.	5261	*Pimelea rosea (Rose Banjine)*			
598.	18117	*Pimelea rosea subsp. rosea*			
599.	87	*Pinus pinaster (Pinaster Pine)*	Y		
600.	42281	*Pithocarpa cordata*			
601.	24841	*Platalea flavipes (Yellow-billed Spoonbill)*			
602.	25720	*Platycercus icterotis (Western Rosella)*			
603.	24747	*Platycercus spurius (Red-capped Parrot)*			
604.	25721	*Platycercus zonarius (Australian Ringneck, Ring-necked Parrot)*			
605.	24750	*Platycercus zonarius subsp. semitorquatus (Twenty-eight Parrot)*			
606.	38823	*Pleuroflammula praestans*			
607.	571	*Poa annua (Winter Grass)*	Y		
608.	573	*Poa drummondiana (Knotted Poa)*			
609.	577	*Poa poiformis (Coastal Poa)*			
610.	578	*Poa porphyroclados*			
611.	25704	*Podiceps cristatus (Great Crested Grebe)*			
612.	8175	*Podolepis gracilis (Slender Podolepis)*			
613.	8182	*Podotheca angustifolia (Sticky Longheads)*			
614.	8183	*Podotheca chrysantha (Yellow Podotheca)*			
615.	8184	*Podotheca gnaphalioides (Golden Long-heads)*			
616.		*Podotheca sp.*			
617.	25510	*Pogona minor (Dwarf Bearded Dragon)*			
618.	24907	*Pogona minor subsp. minor (Dwarf Bearded Dragon)*			
619.	24681	*Poliocephalus poliocephalus (Hoary-headed Grebe)*			
620.	582	*Polypogon monspeliensis (Annual Beardgrass)*	Y		
621.	25722	*Polytelis anthopeplus (Regent Parrot)*			
622.	25731	*Porphyrio porphyrio (Purple Swamphen)*			
623.	24767	*Porphyrio porphyrio subsp. bellus (Purple Swamphen)*			
624.	1668	*Prasophyllum brownii*			
625.	1670	*Prasophyllum drummondii (Swamp Leek Orchid)*			
626.	1672	*Prasophyllum fimbria (Fringed Leek Orchid)*			
627.	1674	*Prasophyllum giganteum (Bronze Leek Orchid)*			
628.	1676	*Prasophyllum hians (Yawning Leek Orchid)*			
629.	25511	*Pseudonaja affinis (Dugite)*			
630.	25259	*Pseudonaja affinis subsp. affinis (Dugite)*			
631.	25264	*Pseudonaja nuchalis (Gwardar, Northern Brown Snake)*			
632.	24702	*Pterodroma brevirostris (Kerguelen Petrel)*			
633.	25710	*Pterodroma macroptera (Great-winged Petrel)*			
634.		*Pterostylis aff. nana*			
635.	48678	*Pterostylis angulata*			
636.	1686	*Pterostylis barbata (Bird Orchid)*			
637.	17267	*Pterostylis brevisepala*			
638.	48674	*Pterostylis orbiculata*			
639.	11118	*Pterostylis pyramidalis (Snail Orchid)*			
640.	12217	*Pterostylis sanguinea*			
641.		*Pterostylis sp.*			
642.	2718	*Ptilotus drummondii (Narrowleaf Mulla Mulla)*			
643.	2751	*Ptilotus polystachyus (Prince of Wales Feather)*			
644.	2759	*Ptilotus sericostachyus*			
645.	15856	*Ptilotus sericostachyus subsp. sericostachyus*			
646.	24711	*Puffinus assimilis subsp. assimilis (Little Shearwater)*			
647.		*Purpureicephalus spurius*			
648.	8195	*Quinetia urvillei*			
649.	2935	*Ranunculus pumilio (Smallflower Buttercup)*			
650.	11927	*Ranunculus sessiliflorus var. sessiliflorus*			
651.	2938	*Ranunculus trilobus (Buttercup)*	Y		
652.	3061	*Raphanus raphanistrum (Wild Radish)*	Y		
653.	24243	*Rattus fuscipes (Western Bush Rat)*			
654.	24245	*Rattus rattus (Black Rat)*	Y		
655.		*Raveniella peckorum*			
656.	24776	*Recurvirostra novaehollandiae (Red-necked Avocet)*			
657.	38832	*Resupinatus cinerascens*			
658.	19183	*Retama raetam*	Y		
659.	11341	*Rhagodia baccata subsp. baccata*			
660.	11930	*Rhagodia baccata subsp. dioica (Sea Berry Saltbush)*			

Appendix 5

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661.	48096	*Rhipidura albiscapa (Grey Fantail)*			
662.	25614	*Rhipidura leucophrys (Willie Wagtail)*			
663.	24454	*Rhipidura leucophrys subsp. leucophrys (Willie Wagtail)*			
664.	13300	*Rhodanthe citrina*			
665.		*Rhycherus gloveri*			
666.	1556	*Romulea rosea (Guildford Grass)*	Y		
667.	2433	*Rumex crispus (Curled Dock)*	Y		
668.	2440	*Rumex pulcher (Fiddle Dock)*	Y		
669.	40426	*Rytidosperma occidentale*			
670.	48430	*Salicornia quinqueflora*			
671.	48431	*Salicornia quinqueflora subsp. quinqueflora (Beaded Glasswort)*			
672.	6483	*Samolus junceus*			
673.	7368	*Scabiosa atropurpurea (Purple Pincushion)*	Y		
674.	7595	*Scaevola anchusifolia*			
675.	7603	*Scaevola canescens (Grey Scaevola)*			
676.	7606	*Scaevola crassifolia (Thick-leaved Fan-flower)*			
677.	7614	*Scaevola globulifera*			
678.	13152	*Scaevola thesioides subsp. thesioides*			
679.	48834	*Schinus terebinthifolia*	Y		
680.	48356	*Schoenoplectus tabernaemontani*			
681.	978	*Schoenus brevisetis*			
682.	986	*Schoenus efoliatus*			
683.	992	*Schoenus grandiflorus (Large Flowered Bogrush)*			
684.	1004	*Schoenus nitens (Shiny Bog-rush)*			
685.	1006	*Schoenus odontocarpus*			
686.	1018	*Schoenus subfascicularis*			
687.	6033	*Scholtzia involucrata (Spiked Scholtzia)*			
688.	6	*Selaginella gracillima (Tiny Clubmoss)*			
689.	32433	*Sematophyllum homomallum*			
690.	25878	*Senecio condylus*			
691.	8203	*Senecio diaschides*			
692.	20161	*Senecio pinnatifolius*			
693.	8218	*Senecio ramosissimus (Auricled Groundsel)*			
694.	25534	*Sericornis frontalis (White-browed Scrubwren)*			
695.	24279	*Sericornis frontalis subsp. maculatus (White-browed Scrubwren)*			
696.	2909	*Silene gallica (French Catchfly)*	Y		
697.	8224	*Siloxerus filifolius*			
698.	8225	*Siloxerus humifusus (Procumbent Siloxerus)*			
699.	25266	*Simoselaps bertholdi (Jan's Banded Snake)*			
700.	30948	*Smicrornis brevirostris (Weebill)*			
701.	8230	*Sonchus asper (Rough Sowthistle)*	Y		
702.	9367	*Sonchus hydrophilus (Native Sowthistle)*			
703.	8231	*Sonchus oleraceus (Common Sowthistle)*	Y		
704.	1312	*Sowerbaea laxiflora (Purple Tassels)*			
705.		*Sphyraena obtusata*			
706.	624	*Spinifex hirsutus (Hairy Spinifex)*			
707.	625	*Spinifex longifolius (Beach Spinifex)*			
708.	8710	*Sporobolus africanus (Parramatta Grass)*	Y		
709.	635	*Sporobolus virginicus (Marine Couch)*			
710.	4828	*Spyridium globulosum (Basket Bush)*			
711.		*Squatina australis*			
712.	9069	*Stackhousia huegelii*			
713.	4733	*Stackhousia monogyna*			
714.	2918	*Stellaria media (Chickweed)*	Y		
715.	48113	*Stenella coeruleoalba (Striped Dophin)*			
716.	24522	*Sterna bergii (Crested Tern)*			
717.	24533	*Sterna paradisaea (Arctic Tern)*			
718.	48594	*Sternula nereis (Fairy Tern)*			
719.	24554	*Stipiturus malachurus subsp. westernensis (Southern Emu-wren)*			
720.	2316	*Stirlingia latifolia (Blueboy)*			
721.	25597	*Strepera versicolor (Grey Currawong)*			
722.	25590	*Streptopelia senegalensis (Laughing Turtle-Dove)*	Y		
723.	25518	*Strophurus spinigerus*			
724.	7693	*Stylidium brunonianum (Pink Fountain Triggerplant)*			
725.	7696	*Stylidium calcaratum (Book Triggerplant)*			
726.	7712	*Stylidium despectum (Dwarf Triggerplant)*			
727.	7713	*Stylidium dichotomum (Pins-and-needles)*			
728.	7717	*Stylidium divaricatum (Daddy-long-legs)*			
729.	25829	*Stylidium neurophyllum (Coastal Plain Triggerplant)*			
730.	7774	*Stylidium piliferum (Common Butterfly Triggerplant)*			

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
731.	7785	*Stylidium repens (Matted Triggerplant)*			
732.	7798	*Stylidium schoenoides (Cow Kicks)*			
733.	2639	*Suaeda australis (Seablite)*			
734.	2329	*Synaphea spinulosa*			
735.	25705	*Tachybaptus novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
736.	24682	*Tachybaptus novaehollandiae subsp. novaehollandiae (Australasian Grebe, Black-throated Grebe)*			
737.	25552	*Tadorna radjah (Radjah Shelduck)*			
738.	24331	*Tadorna tadornoides (Australian Shelduck, Mountain Duck)*			
739.	20135	*Taxandria linearifolia*			
740.	4256	*Templetonia retusa (Cockies Tongues)*			
741.	2791	*Tersonia cyathiflora (Button Creeper)*			
742.	2820	*Tetragonia decumbens (Sea Spinach)*	Y		
743.	1036	*Tetraria octandra*			
744.		*Thelymitra aff. pauciflora*			
745.	1701	*Thelymitra antennifera (Vanilla Orchid)*			
746.	10856	*Thelymitra benthamiana (Leopard Orchid)*			
747.	1705	*Thelymitra crinita (Blue Lady Orchid)*			
748.	1707	*Thelymitra flexuosa (Twisted Sun Orchid)*			
749.	1708	*Thelymitra fuscolutea (Chestnut Sun Orchid)*			
750.	20730	*Thelymitra paludosa*			
751.		*Thelymitra sp.*			
752.	2644	*Threlkeldia diffusa (Coast Bonefruit)*			
753.	24845	*Threskiornis spinicollis (Straw-necked Ibis)*			
754.	1318	*Thysanotus arbuscula*			
755.	1319	*Thysanotus arenarius*			
756.	1338	*Thysanotus manglesianus (Fringed Lily)*			
757.	1339	*Thysanotus multiflorus (Many-flowered Fringe Lily)*			
758.	1354	*Thysanotus tenellus*			
759.	25203	*Tiliqua occipitalis (Western Bluetongue)*			
760.	25519	*Tiliqua rugosa*			
761.	25207	*Tiliqua rugosa subsp. rugosa*			
762.	25549	*Todiramphus sanctus (Sacred Kingfisher)*			
763.	32445	*Tortula muralis*			
764.	1368	*Trachyandra divaricata*	Y		
765.	6266	*Trachymene coerulea (Blue Lace Flower)*			
766.	19041	*Trachymene coerulea subsp. coerulea*			
767.	6280	*Trachymene pilosa (Native Parsnip)*			
768.	1481	*Tribonanthes australis (Southern Tiurndin)*			
769.	25723	*Trichoglossus haematodus (Rainbow Lorikeet)*			
770.	25521	*Trichosurus vulpecula (Common Brushtail Possum)*			
771.	24158	*Trichosurus vulpecula subsp. vulpecula (Common Brushtail Possum)*			
772.	1361	*Tricoryne elatior (Yellow Autumn Lily)*			
773.	4291	*Trifolium arvense (Hare's Foot Clover)*	Y		
774.	4292	*Trifolium campestre (Hop Clover)*	Y		
775.	4295	*Trifolium dubium (Suckling Clover)*	Y		
776.	4297	*Trifolium glomeratum (Cluster Clover)*	Y		
777.	147	*Triglochin mucronata*			
778.	151	*Triglochin striata*			
779.	152	*Triglochin trichophora*			
780.		*Trygonoptera mucosa*			
781.		*Trygonoptera personata*			
782.	11665	*Trymalium ledifolium var. ledifolium*			
783.	48147	*Turnix varius (Painted Button-quail)*			
784.	24852	*Tyto alba subsp. delicatula (Barn Owl)*			
785.		*Urolophus lobatus*			
786.	8255	*Ursinia anthemoides (Ursinia)*	Y		
787.	24386	*Vanellus tricolor (Banded Lapwing)*			
788.	25218	*Varanus gouldii (Bungarra or Sand Monitor)*			
789.	25225	*Varanus rosenbergi (Heath Monitor)*			
790.	25526	*Varanus tristis (Racehorse Monitor)*			
791.	25227	*Varanus tristis subsp. tristis (Racehorse Monitor)*			
792.	7107	*Verbascum virgatum (Twiggy Mullein)*	Y		
793.	15725	*Verbesina encelioides*	Y		
794.	46275	*Verbesina encelioides var. encelioides (Crownbeard, Wild Sunflower, Goldweed, South African Daisy)*	Y		
795.	24206	*Vespadelus regulus (Southern Forest Bat)*			
796.	4325	*Viminaria juncea (Swishbush, Koweda)*			
797.	24040	*Vulpes vulpes (Red Fox)*	Y		
798.	722	*Vulpia bromoides (Squirrel Tail Fescue)*	Y		

Appendix 5

	Name ID	Species Name	Naturalised	Conservation Code	[1]Endemic To Query Area
799.	11137	*Vulpia fasciculata*	Y		
800.	724	*Vulpia myuros (Rat's Tail Fescue)*	Y		
801.	33101	*Vulpia myuros forma myuros*	Y		
802.	7389	*Wahlenbergia preissii*			
803.	6939	*Westringia dampieri*			
804.	1398	*Wurmbea monantha*			
805.	1256	*Xanthorrhoea preissii (Grass tree, Palga)*			
806.	6289	*Xanthosia huegelii*			
807.	25765	*Zosterops lateralis (Grey-breasted White-eye, Silvereye)*			
808.	36218	*Zygodon menziesii*			

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 5

APPENDIX 3

Conservation Codes

Appendix 5

Conservation Codes for Western Australian Flora and Fauna

Specially protected fauna or flora are species* which have been adequately searched for and are deemed to be, in the wild, either rare, at risk of extinction, or otherwise in need of special protection, and have been gazetted as such. Conservation codes have been transitioned under regulations 170, 171 and 172 of the *Biodiversity Conservation Regulations 2018.*

T Threatened species – Schedules 1-4

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 *Biodiversity Conservation Act 2016* (BC Act).

- **Threatened fauna** is that subset of 'Specially Protected Fauna' listed under schedules 1 to 3 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for Threatened Fauna.
- **Threatened flora** is that subset of 'Rare Flora' listed under schedules 1 to 3 of the *Wildlife Conservation (Rare Flora) Notice 2018* for Threatened Flora.

The assessment of the conservation status of these species is based on their national extent and ranked according to their level of threat using IUCN Red List categories and criteria as detailed below.

CR Critically endangered species

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 species

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 species

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*

Appendix 5

Conservation (Specially Protected Fauna) Notice 2018 for vulnerable fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for vulnerable flora.

EX Presumed extinct species

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).

Published as presumed extinct under schedule 4 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018* for extinct fauna or the *Wildlife Conservation (Rare Flora) Notice 2018* for extinct flora.

EW Extinct in the wild species

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.

Specially protected species

Listed by order of the Minister as specially protected under section 13(1) of the BC Act. Meeting one or more of the following categories: species of special conservation interest; migratory species; cetaceans; species subject to international agreement; or species otherwise in need of special protection.

Species that are listed as threatened species (critically endangered, endangered or vulnerable) or extinct species under the BC Act cannot also be listed as Specially Protected species.

MI Migratory species

Fauna that periodically or occasionally visit Australia or an external Territory or the exclusive economic zone; or the species is subject of an international agreement that relates to the protection of migratory species and that binds the Commonwealth; and listing is otherwise in accordance with the ministerial guidelines (section 15 of the BC Act).

Includes birds that are subject to an agreement between the government of Australia and the governments of Japan (JAMBA), China (CAMBA) and The Republic of Korea (ROKAMBA), and fauna subject to the Convention on the Conservation of Migratory Species of Wild Animals (Bonn Convention), an environmental treaty under the United Nations Environment Program. Migratory species listed under the BC Act are a subset of the migratory animals, that are known to visit Western Australia, protected under the international agreements or treaties, excluding species that are listed as Threatened species.

Appendix 5

Published as migratory birds protected under an international agreement under schedule 5 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018.*

CD Species of special conservation interest (conservation dependent fauna)

Fauna of special conservation need being species dependent on ongoing conservation intervention to prevent it becoming eligible for listing as threatened, and listing is otherwise in accordance with the ministerial guidelines (section 14 of the BC Act).

Published as conservation dependent fauna under schedule 6 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

OS Other specially protected species

Fauna otherwise in need of special protection to ensure their conservation, and listing is otherwise in accordance with the ministerial guidelines (section 18 of the BC Act).

Published as other specially protected fauna under schedule 7 of the *Wildlife Conservation (Specially Protected Fauna) Notice 2018*.

P Priority species

Possibly threatened species that do not meet survey criteria, or are otherwise data deficient, are added to the Priority Fauna or Priority Flora Lists under Priorities 1, 2 or 3. These three categories are ranked in order of priority for survey and evaluation of conservation status so that consideration can be given to their declaration as threatened fauna or flora.

Species that are adequately known, are rare but not threatened, or meet criteria for near threatened, or that have been recently removed from the threatened species or other specially protected fauna lists for other than taxonomic reasons, are placed in Priority 4. These species require regular monitoring.

Assessment of Priority codes is based on the Western Australian distribution of the species, unless the distribution in WA is part of a contiguous population extending into adjacent States, as defined by the known spread of locations.

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.

Appendix 5

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.

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.

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.

*Species includes all taxa (plural of taxon - a classificatory group of any taxonomic rank, e.g. a family, genus, species or any infraspecific category i.e. subspecies or variety, or a distinct population).

Western Australian Ecological Communities

Threatened Ecological Communities

The BC Act provides for the statutory listing of threatened ecological communities (TECs) by the Minister.

Presumed Totally Destroyed (PD)

An ecological community that has been adequately searched for but for which no representative occurrences have been located. The community has been found to be totally destroyed or so extensively modified throughout its range that no occurrence of it is likely to recover its species composition and/or structure in the foreseeable future.

Appendix 5

Critically Endangered (CR)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or that was originally of limited distribution and is facing severe modification or destruction throughout its range in the immediate future, or is already severely degraded throughout its range but capable of being substantially restored or rehabilitated.

Endangered (EN)

An ecological community that has been adequately surveyed and found to have been subject to a major contraction in area and/or was originally of limited distribution and is in danger of significant modification throughout its range or severe modification or destruction over most of its range in the near future.

Vulnerable (VU)

An ecological community that has been adequately surveyed and is found to be declining and/or has declined in distribution and/or condition and whose ultimate security has not yet been assured and/or a community that is still widespread but is believed likely to move into a category of higher threat in the near future if threatening processes continue or begin operating throughout its range.

Priority Ecological Communities

Possible threatened ecological communities that do not meet survey criteria or that are not adequately defined are added to the Priority Ecological Community List under priorities 1, 2 and 3. These three categories are ranked in order of priority for survey and/or definition of the community. Ecological communities that are adequately known, and are rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list, are placed in Priority 4. These ecological communities require regular monitoring. Conservation Dependent ecological communities are placed in Priority 5.

Priority One: Poorly-known ecological communities

Ecological communities that are known from very few occurrences with a very restricted distribution (generally ≤5 occurrences or a total area of ≤ 100ha).

Occurrences are believed to be under threat either due to limited extent, or being on lands under immediate threat (e.g. within agricultural or pastoral lands, urban areas, active mineral leases) or for which current threats exist. May include communities with occurrences on protected lands. Communities may be included if they are comparatively well-known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under immediate threat from known threatening processes across their range.

Appendix 5

Priority Two: Poorly-known ecological communities

Communities that are known from few occurrences with a restricted distribution (generally ≤10 occurrences or a total area of ≤200ha). At least some occurrences are not believed to be under immediate threat (within approximately 10 years) of destruction or degradation. Communities may be included if they are comparatively well known from one or more localities but do not meet adequacy of survey requirements, and/or are not well defined, and appear to be under threat from known threatening processes.

Priority Three: Poorly known ecological communities

(i) Communities that are known from several to many occurrences, a significant number or area of which are not under threat of habitat destruction or degradation or:

(ii) communities known from a few widespread occurrences, which are either large or with significant remaining areas of habitat in which other occurrences may occur, much of it not under imminent threat (within approximately 10 years), or;

(iii) munities made up of large, and/or widespread occurrences, that may or may not be represented in the reserve system, but are under threat of modification across much of their range from processes such as grazing by domestic and/or feral stock, inappropriate fire regimes, clearing, hydrological change etc.

Communities may be included if they are comparatively well known from several localities but do not meet adequacy of survey requirements and/or are not well defined, and known threatening processes exist that could affect them.

Priority Four: Ecological communities that are adequately known, rare but not threatened or meet criteria for Near Threatened, or that have been recently removed from the threatened list. These communities require regular monitoring.

(i) Rare. Ecological communities known from few occurrences 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 communities are usually represented on conservation lands.

(ii) Near Threatened. Ecological communities that are considered to have been adequately surveyed and that do not qualify for Conservation Dependent, but that are close to qualifying for a higher threat category.

(iii) Ecological communities that have been removed from the list of threatened communities during the past five years.

Priority Five: Conservation Dependent ecological communities

Ecological communities that are not threatened but are subject to a specific conservation program, the cessation of which would result in the community becoming threatened within five years.

Appendix 5

Commonwealth of Australia Conservation Codes

Threatened Flora and Fauna

Threatened fauna and flora may be listed under Section 178 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in any one of the following six categories:

Extinct

A native species is eligible to be included in the extinct category at a particular time if, at that time, there is no reasonable doubt that the last member of the species has died.

Extinct in the wild

A native species is eligible to be included in the extinct in the wild category at a particular time if, at that time:

a) it is known only to survive in cultivation, in captivity or as a naturalised population well outside its past range; or
b) it has not been recorded in its known and/or expected habitat, at appropriate seasons, anywhere in its past range, despite exhaustive surveys over a time frame appropriate to its life cycle and form.

Critically endangered

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing an extremely high risk of extinction in the wild.

Endangered

A taxon is Endangered when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a very high risk of extinction in the wild.

Vulnerable

A taxon is Vulnerable when the best available evidence indicates that it meets any of the five criteria for the category identified in Part 7.01 of the EPBC Regulations, and it is therefore considered to be facing a high risk of extinction in the wild.

Conservation dependent

A native species is eligible to be included in the conservation dependent category at a particular time if, at that time:

a) the species is the focus of a specific conservation program the cessation of which would result in the species becoming vulnerable, endangered or critically endangered; or
b) the following subparagraphs are satisfied:
   i. the species is a species of fish;

Appendix 5

ii. the species is the focus of a plan of management that provides for management actions necessary to stop the decline of, and support the recovery of, the species so that its chances of long term survival in nature are maximised;
iii. the plan of management is in force under a law of the Commonwealth or of a State or Territory;
iv. cessation of the plan of management would adversely affect the conservation status of the species.

The EPBC Act does not provide for listing in a data deficient category. Where sufficient data (evidence) is unavailable to allow assessment by the Threatened Species Scientific Committee against the criteria for listing, the species are found to be ineligible. A recommendation is made to the Minister to not include the species in any category under the EPBC Act. For reasons of transparency and to inform future research, the Threatened Species Scientific Committee publishes the names of those species found to be data deficient. As data deficient is not a listing category under the EPBC Act, this has no statutory implications and the species is not considered to be listed under the EPBC Act.

Threatened Ecological Communities

Threatened Ecological communities under the EPBC Act are listed in three categories.

Critically endangered

If, at that time, an ecological community is facing an extremely high risk of extinction in the wild in the immediate future (indicative timeframe being the next 10 years).

Endangered

If, at that time, an ecological community is not critically endangered but is facing a very high risk of extinction in the wild in the near future (indicative timeframe being the next 20 years).

Vulnerable

If, at that time, an ecological community is not critically endangered or endangered, but is facing a high risk of extinction in the wild in the medium–term future (indicative timeframe being the next 50 years).

Appendix 5

APPENDIX 4

Species List

Appendix 5

SPECIES LIST – Golden Bay LPA

GYMNOSPERMS

CUPRESSACEAE
**Callitris preissii*

MONOCOTYLEDONS

ASPARAGACEAE
Acanthocarpus preissii
**Agave americana*
Lomandra maritima
Thysanotus sparteus

ASPHODELACEAE
**Trachyandra divaricata*

COLCHICACEAE
Wurmbea monantha

CYPERACEAE
Isolepis marginata
Lepidosperma calcicola
Lepidosperma gladiatum
Schoenus grandiflorus

HAEMODORACEAE
Conostylis candicans

HEMEROCALLIDACEAE
Tricoryne tenella

ORCHIDACEAE
Caladenia latifolia

POACEAE
**Anthoxanthum odoratum*
Austrostipa flavescens
**Avena fatua*
**Bromus diandrus*
**Ehrharta calycina*
**Ehrharta longiflora*
**Lagurus ovatus*
**Lolium perenne*
Poa porphyroclados

RESTIONACEAE
Desmocladus flexuosus

DICOTYLEDONS

ANACARDIACEAE
**Schinus terebinthifolius*

APIACEAE
Daucus glochidiatus

APOCYNACEAE
Alyxia buxifolia
**Gomphocarpus fruticosus*

ARALIACEAE
Hydrocotyle intertexta
Trachymene pilosa

ASTERACEAE
Asteridea pulverulenta
**Gazania linearis*
Leptorhynchos scaber
Olearia axillaris
**Osteospermum ecklonis*
Pithocarpa cordata
Senecio pinnatifolius
**Sonchus oleraceus*

BRASSICACEAE
**Diplotaxis muralis*
**Heliophila pusilla*

CAPRIFOLIACEAE
**Centranthus macrosiphon*

CARYOPHYLLACEAE
**Minuartia mediterranea*

CHENOPODIACEAE
Rhagodia baccata

Appendix 5

CONVOLVULACEAE
**Cuscuta epithymum*
CRASSULACEAE
**Crassula glomerata*

DILLENIACEAE
Hibbertia cuneiformis

ERICACEAE
Leucopogon parviflorus

EUPHORBIACEAE
**Euphorbia terracina*

FABACEAE
Acacia cochlearis
Acacia rostellifera
Acacia saligna
Gompholobium tomentosum
Hardenbergia comptoniana
Jacksonia furcellata

GERANIACEAE
**Pelargonium capitatum*

GOODENIACEAE
Scaevola thesioides

LAMIACEAE
Hemiandra pungens

LAURACEAE
Cassytha flava
Cassytha racemosa

LOBELIACEAE
Lobelia tenuior

MONTIACEAE
Calandrinia brevipedata
Calandrinia liniflora

MYRTACEAE
**Chamelaucium uncinatum*
Melaleuca systena

ONAGRACEAE
**Oenothera drummondii*

OROBANCHACEAE
**Bellardia trixago*
**Bellardia viscosa*
**Orobanche minor*
**Parentucellia latifolia*

OXALIDACEAE
**Oxalis pes-caprae*

PAPAVERACEAE
**Fumaria capreolata*

PHYLLANTHACEAE
Phyllanthus calycinus
Poranthera microphylla

PRIMULACEAE
**Lysimachia arvensis*

PROTEACEAE
Hakea prostrata

RANUNCULACEAE
Clematis linearifolia

RHAMNACEAE
Cryptandra mutila
Trymalium ledifolium
Spyridium globulosum

RUBIACEAE
Opercularia vaginata

RUTACEAE
Diplolaena dampieri

SANTALACEAE
Exocarpos sparteus
Santalum acuminatum

Appendix 5

SCROPHULARIACEAE
**Dischisma arenarium*
Eremophila glabra

SOLANACEAE
**Solanum nigrum*

TROPAEOLACEAE
**Tropaeolum majus*

URTICACEAE
Parietaria debilis

Appendix 5

APPENDIX 5

Quadrat Data

Appendix 5

QUADRAT GB 1

50 383848 E 6411647 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Very Good
Soil Type: Light brown sand
Landform: Steeply sloping down to the north-east
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1	20
Melaleuca systena	1	15
Austrostipa flavescens	1.1	2
Spyridium globulosum	0.8	1
Acacia lasiocarpa	0.5	10
Cryptandra mutila	0.5	1
**Bromus diandrus*	0.4	10
**Euphorbia terracina*	0.4	2
**Lagurus ovatus*	0.4	1
**Lolium perenne*	0.4	1
Phyllanthus calycinus	0.4	<1
**Pelargonium capitatum*	0.4	<1
Asteridea pulverulenta	0.4	<1
Acanthocarpus preissii	0.3	5
Lomandra maritima	0.3	2
Conostylis candicans	0.3	1
Senecio pinnatifolius	0.3	1
Scaevola thesioides	0.3	1

Appendix 5

SPECIES	HEIGHT (m)	COVER (%)
Leptorhynchos scaber	0.3	<1
Lobelia tenuior	0.3	<1
**Diplotaxis muralis*	0.3	<1
**Lysimachia arvensis*	0.2	1
**Sonchus oleraceus*	0.2	<1
**Bellardia trixago*	0.2	<1
Desmocladus flexuosus	0.1	1
Calandrinia liniflora	0.1	<1
Calandrinia brevipedata	0.1	<1
Trachymene pilosa	<0.1	1
Parietaria debilis	<0.1	<1
**Crassula glomerata*	<0.1	<1
Isolepis marginata	<0.1	<1
Cassytha flava	Climber	2

* introduced species

Appendix 5

QUADRAT GB 2

50 383770 E 6411530 N

Vegetation: *Acacia rostellifera/Spyridium globulosum/Diplolaena dampieri* Closed Heath over *Lepidosperma gladiatum* Sedgeland
Condition: Very Good
Soil Type: Light brown sand
Landform: Steeply sloping down to the south
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1.8	40
Spyridium globulosum	1.8	30
Santalum acuminatum	1.1	2
Lepidosperma gladiatum	0.8	5
Senecio pinnatifolius	0.8	<1
Diplolaena dampieri	0.6	20
Austrostipa flavescens	0.6	<1
Acanthocarpus preissii	0.4	5
Rhagodia baccata	0.4	2
**Bromus diandrus*	0.4	1
**Lolium perenne*	0.3	2
Lomandra maritima	0.3	1
**Lagurus ovatus*	0.3	1
Conostylis candicans	0.3	<1
**Sonchus oleraceus*	0.3	<1
Daucus glochidiatus	0.2	10
Parietaria debilis	0.2	<1

Appendix 5

SPECIES	HEIGHT (m)	COVER (%)
Hydrocotyle intertexta	0.1	1
Clematis linearifolia	Climber	2

* introduced species

Appendix 5

QUADRAT GB 3

50 383692 E 6411552 N

Vegetation: *Spyridium globulosum/Acacia rostellifera* Open Heath over weeds
Condition: Degraded
Soil Type: Dark brown-black sand
Landform: Depression between dunes
Date: 16.10.20
Recorder: Paul van der Moezel



Quadrat (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Spyridium globulosum	1.9	40
Acacia rostellifera	1.5	5
Austrostipa flavescens	0.7	2
**Bromus diandrus*	0.4	50
**Lolium perenne*	0.4	20
Melaleuca systena	0.4	1
Diplolaena dampieri	0.4	1
Acanthocarpus preissii	0.4	1
Olearia axillaris	0.4	<1
Rhagodia baccata	0.3	1
Senecio pinnatifolius	0.3	1
Parietaria debilis	0.3	1
Lobelia tenuior	0.3	<1
**Sonchus oleraceus*	0.3	<1
Caladenia latifolia	0.2	<1
Opercularia vaginata	0.2	<1
Daucus glochidiatus	0.1	1
**Dischisma arenarium*	0.1	1
Tricoryne tenella	0.1	<1

Appendix 5

Calandrinia brevipedata	<0.1	2
Isolepis marginata	<0.1	<1
**Crassula glomerata*	<0.1	<1
Hardenbergia comptoniana	Climber	1

* introduced species

Appendix 5

QUADRAT GB 4

50 383693 E 6411284 N

Vegetation: *Acacia rostellifera/Spyridium globulosum* Open Heath over weeds
Condition: Good
Soil Type: Cream sand
Landform: Upper slope of low dune
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1.5	60
Santalum acuminatum	1	1
**Ehrharta calycina*	0.8	<1
Austrostipa flavescens	0.7	1
Poa porphyroclados	0.7	<1
Melaleuca systena	0.6	5
Spyridium globulosum	0.5	2
**Bromus diandrus*	0.4	40
**Lolium perenne*	0.4	20
Opercularia vaginata	0.4	10
Conostylis candicans	0.4	<1
Parietaria debilis	0.3	5
Phyllanthus calycinus	0.4	<1
Caladenia latifolia	0.4	<1
**Lagurus ovatus*	0.3	<1
**Trachyandra divaricata*	0.3	<1
Daucus glochidiatus	0.2	<1
**Sonchus oleraceus*	0.2	<1
**Bellardia viscosa*	0.2	<1

Appendix 5

SPECIES	HEIGHT (m)	COVER (%)
Hydrocotyle intertexta	0.1	1
**Cerastium glomeratum*	0.1	<1
**Crassula glomerata*	<0.1	1
Isolepis marginata	<0.1	<1
Calandrinia liniflora	<0.1	<1
**Dischisma arenarium*	<0.1	<1
Cassytha racemosa	Climber	10
Hardenbergia comptoniana	Climber	<1

* introduced species

Appendix 5

QUADRAT GB 5

50 383673 E 6411225 N

Vegetation: *Santalum acuminatum/Melaleuca systena/Acacia lasiocarpa/ Lomandra maritima* Open Low Heath
Condition: Very Good
Soil Type: Brown sand, some surface limestone
Landform: Lower slope of tall dune
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Santalum acuminatum	0.8	10
Austrostipa flavescens	0.8	1
**Ehrharta longiflora*	0.7	<1
Poa porphyroclados	0.6	<1
Melaleuca systena	0.5	30
Trymalium ledifolium	0.5	5
Hakea prostrata	0.5	2
Acanthocarpus preissii	0.4	10
Acacia lasiocarpa	0.4	5
Gompholobium tomentosum	0.4	4
Senecio pinnatifolius	0.4	<1
**Diplotaxis muralis*	0.4	<1
Schoenus grandiflorus	0.4	<1
Lomandra maritima	0.3	30
Opercularia vaginata	0.3	2
**Lolium perenne*	0.3	1
Thysanotus sparteus	0.3	<1
Lobelia tenuior	0.3	<1

APPENDIX 5

SPECIES	HEIGHT (m)	COVER (%)
**Pelargonium capitatum*	0.3	<1
Conostylis candicans	0.2	1
**Heliophila pusilla*	0.2	1
**Lagurus ovatus*	0.2	<1
Lepidosperma calcicola	0.2	<1
Desmocladus flexuosus	0.1	10
Spyridium globulosum	0.1	<1
Calandrinia liniflora	0.1	<1
Scaevola thesioides	0.1	<1
**Sonchus oleraceus*	0.1	<1
**Minuartia mediterranea*	<0.1	4
Poranthera microphylla	<0.1	<1
**Crassula glomerata*	<0.1	<1
Cassytha racemosa	Climber	<1
Hardenbergia comptoniana	Climber	<1
Clematis linearifolia	Climber	<1

* introduced species

Appendix 5

QUADRAT GB 6

50 384026 E 6411054 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Very Good
Soil Type: Light brown sand
Landform: Mid-slope, sloping down to the north-west
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1	20
Austrostipa flavescens	0.6	1
**Avena fatua*	0.6	<1
**Bromus diandrus*	0.5	<1
Thysanotus sparteus	0.5	<1
Lomandra maritima	0.4	30
Acacia lasiocarpa	0.4	10
Melaleuca systena	0.4	5
**Lolium perenne*	0.4	5
Trymalium ledifolium	0.4	5
**Anthoxanthum odoratum*	0.4	2
Gompholobium tomentosum	0.4	<1
Phyllanthus calycinus	0.4	<1
Poa porphyroclados	0.4	<1
Acanthocarpus preissii	0.3	10
Lepidosperma calcicola	0.3	2
Cryptandra mutila	0.3	1

APPENDIX 5

SPECIES	HEIGHT (m)	COVER (%)
Scaevola thesioides	0.3	<1
Senecio pinnatifolius	0.3	<1
Conostylis candicans	0.3	<1
**Sonchus oleraceus*	0.3	<1
**Pelargonium capitatum*	0.3	<1
Desmocladus flexuosus	0.2	1
Lobelia tenuior	0.2	<1
Hydrocotyle intertexta	0.2	<1
Leptorhynchos scaber	0.2	<1
Wurmbea monantha	0.2	<1
**Heliophila pusilla*	0.2	<1
Tricoryne tenella	0.1	<1
**Lysimachia arvensis*	0.1	<1
Poranthera microphylla		
**Minuartia mediterranea*	0.1	<1
Trachymene pilosa	<0.1	1
Cassytha flava	Climber	5
Hardenbergia comptoniana	Climber	<1

* introduced species

Appendix 5

QUADRAT GB 7

50 383752 E 6411036 N

Vegetation: *Acacia rostellifera/Melaleuca systena/Acacia lasiocarpa* Open Low Heath
Condition: Very Good
Soil Type: Grey sand
Landform: Upper slope of tall dune
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1	15
Olearia axillaris	0.8	1
Austrostipa flavescens	0.7	1
Poa porphyroclados	0.6	<1
Rhagodia baccata	0.5	2
Lomandra maritima	0.4	20
**Bromus diandrus*	0.4	10
Acacia lasiocarpa	0.4	5
Melaleuca systena	0.4	5
Spyridium globulosum	0.4	<1
Acanthocarpus preissii	0.3	20
Opercularia vaginata	0.3	10
**Lolium perenne*	0.3	5
Conostylis candicans	0.3	2
Thysanotus sparteus	0.3	<1
Parietaria debilis	0.3	<1
Scaevola thesioides	0.3	1

APPENDIX 5

SPECIES	HEIGHT (m)	COVER (%)
Senecio pinnatifolius	0.3	<1
Desmocladus flexuosus	0.1	1
Hemiandra pungens	0.1	1
**Pelargonium capitatum*	0.1	<1
Lepidosperma calcicola	0.1	<1
Calandrinia liniflora	0.1	<1
**Sonchus oleraceus*	0.1	<1
Poranthera microphylla	<0.1	<1
Trachymene pilosa	<0.1	<1
**Crassula glomerata*	<0.1	<1
Clematis linearifolia	Climber	5
Hardenbergia comptoniana	Climber	1

* introduced species

Appendix 5

QUADRAT GB 8

50 383791 E 6411017 N

Vegetation: *Acacia rostellifera/Spyridium globulosum* Closed Heath
Condition: Good
Soil Type: Grey sand
Landform: Mid-slope, steeply sloping down to the south
Date: 16.10.20
Recorder: Paul van der Moezel



QUADRAT (10 x 10m)

SPECIES	HEIGHT (m)	COVER (%)
Acacia rostellifera	1.8	70
Olearia axillaris	1	10
Spyridium globulosum	0.6	10
Austrostipa flavescens	0.6	1
Rhagodia baccata	0.5	5
**Lolium perenne*	0.5	2
Poa porphyroclados	0.5	<1
Scaevola thesioides	0.5	<1
**Bromus diandrus*	0.4	20
Melaleuca systena	0.4	2
Trymalium ledifolium	0.4	1
Acanthocarpus preissii	0.4	1
**Pelargonium capitatum*	0.4	1
Parietaria debilis	0.3	2
**Centranthus macrosiphon*	0.3	2
Conostylis candicans	0.3	1
**Sonchus oleraceus*	0.3	<1
**Lagurus ovatus*	0.3	<1
Daucus glochidiatus	0.2	2

APPENDIX 5

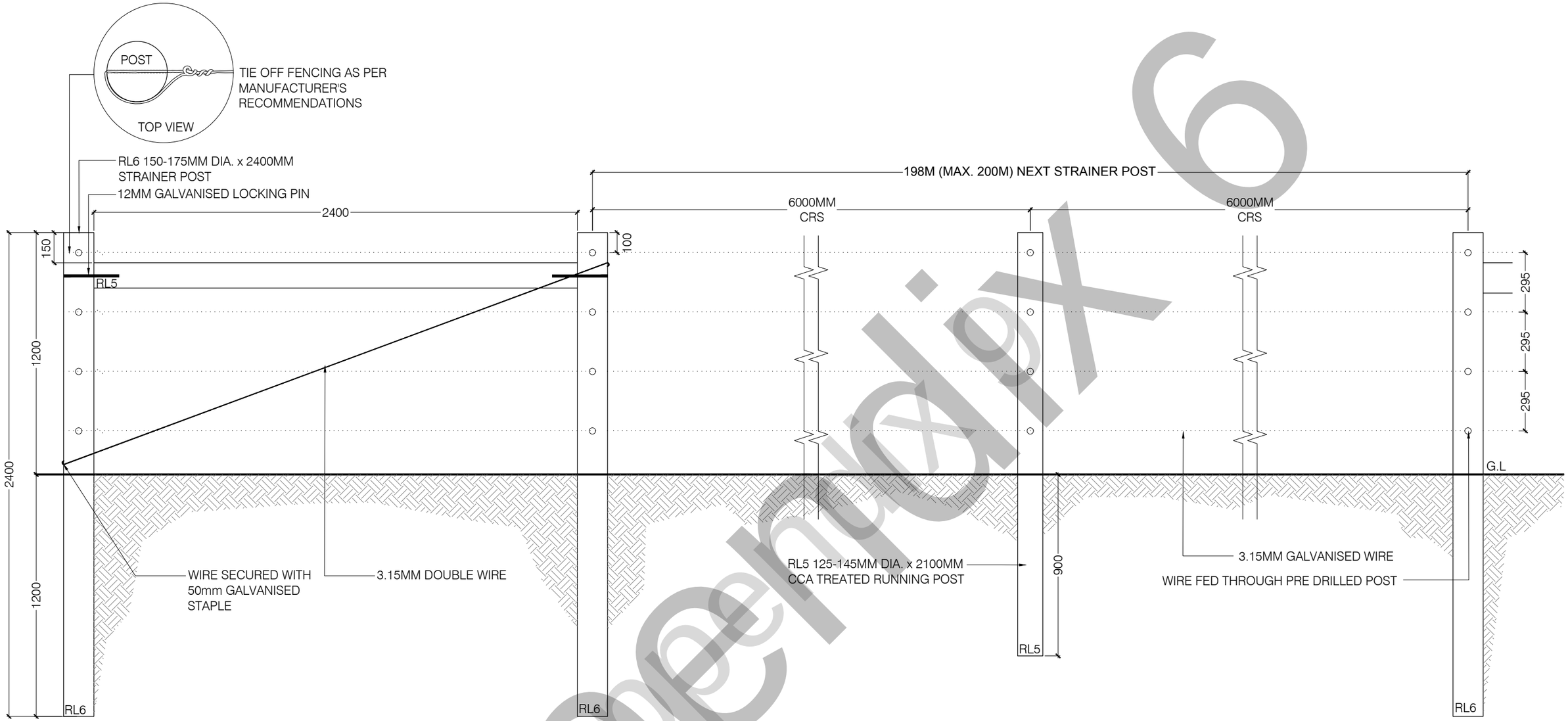
SPECIES	HEIGHT (m)	COVER (%)
**Heliophila pusilla*	0.2	2
**Dischisma arenarium*	0.1	1
**Bellardia viscosa*	0.1	<1
Clematis linearifolia	Climber	10
Hardenbergia comptoniana	Climber	1

* introduced species

Appendix 5

APPENDIX 6

Appendix 9



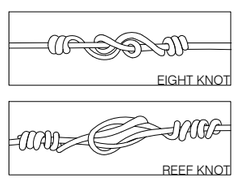
4 STRAND 3.15mm WIRE FENCE
SCALE 1:20 @ A3

MATERIAL SPECIFICATION:

1. RUNNING POST: RL5 Ø125-145mm x 2.1m CCA TREATED PINE
2. BOX STRAINER POST: RL6 Ø150-175mm x 2.4m CCA TREATED PINE
3. BOX STRAINER WIRE: DOUBLE WIRE GALVANISED HIGH TENSILE 3.15MM DIAMETER WITH MINIMUM BREAKING STRAIN 9.4kN
4. 4 STRAND WIRES: GALVANISED HIGH TENSILE 3.15MM DIAMETER WITH MINIMUM BREAKING STRAIN 9.4kN
5. STAPLES 50MM GALVANISED STAPLE NAILS.
6. STRAINER BOX LOCK PINS MINIMUM 12MM GALVANISED METAL ROD;

NOTES:

1. ALL POST TO BE CHROMATED COPPER ARSENATE (CCA) TREATED PINE MINIMUM H4;
2. ALL POST ARE POSITIONED 500mm AWAY FROM PATH EDGES;
3. ALL POST MUST BE PILE DRIVEN; TO BE BURIED TO A DEPTH OF 1200mm;
4. ALL ENDS, JOINTS AND TIES TO BE FINISHED NEATLY WITH NO WIRE PROTRUSIONS;
5. TIE OFF WIRE TO BE FED THROUGH PINE POSTS THEN WOUND BACK AROUND WIRE AND CUT OFF FLUSH AS PER MANUFACTURER'S RECOMMENDATIONS;
6. 4 STRANDS PLAIN WIRES FED THROUGH PRE-DRILLED POSTS; WIRES TO BE FIRMLY SECURED TO POSTS
7. TOP WIRE TENSIONED TO ALLOW IT TO BE PUSHED DOWN 300mm AND BE STEPPED OVER;
8. THE DIAMETER OF EACH TIMBER POST OR RAIL MUST NOT VARY BY MORE THAN 25mm OVER A 2m LENGTH (OR 12.5mm PER METER LENGTH.)
9. FENCE TO SMOOTHLY FOLLOW THE OVERALL CONTOURS OF THE LAND AS FOR BOLLARDS (NOT TO HAVE SUDDEN DIPS AND RISES).
10. ALL UPRIGHTS MUST BE VERTICAL WITHIN A TOLERANCE OF 1:100
11. GALVANISED COATING FOR ALL FERROUS MATERIALS MUST HAVE COATINGS OF ZINC IN COMPLIANCE WITH AS 1650. THE COATINGS FOR WIRES MUST BE TYPE A (HEAVILY GALVANISED).
12. WHERE PLAIN WIRES ARE JOINED TOGETHER, A 'FIGURE- OF EIGHT KNOT' OR 'REEF KNOT' IS USED WITH WIRE ENDS TWITCHED AROUND MAIN WIRE AND EXCESS REMOVED TO ENSURE THERE ARE NO WIRE PROTRUSIONS.
13. WHERE WIRE JOINERS ARE USED THEY MUST BE TWO- DIRECTIONAL WITH CORROSION RESISTANT SPRINGS AND LOCKING MECHANISMS WITH MAX WORKING LOAD 400kg/3.9kN
14. COATING ON ALL GALVANISED MATERIALS MUST COMPLY WITH AS/NZS 4792:2006



CAUTION:

THE INSTALLATION OF FENCE POSTS MUST NOT INTERFERE WITH EXISTING SERVICES INCLUDING STORMWATER DRAINAGE. INSTALLER IS RESPONSIBLE FOR CONTACTING SERVICES AUTHORITIES TO DETERMINE LOCATIONS AND DEPTHS OF SERVICES BEFORE POST INSTALLATION

DANGER:
UNDERGROUND POWER IN THIS LOCATION
CONDUCT 'DIAL BEFORE YOU DIG' BEFORE COMMENCING WORKS

PERTH ONE CALL SYSTEM DIAL 1100 DIAL BEFORE YOU DIG

Appendix 6

REVISIONS

NO.	DESCRIPTION	DATE	SIGNED
1	ISSUED FOR INFORMATION	12/17	
2	ISSUED FOR TENDER	02/18	

PROJECT
STANDING OFFER FOR THE INSTALLATION AND MAINTENANCE OF RESERVE FENCING

TITLE
4 STRAND 3.15mm WIRE FENCE - FORESHORE(2.1m)

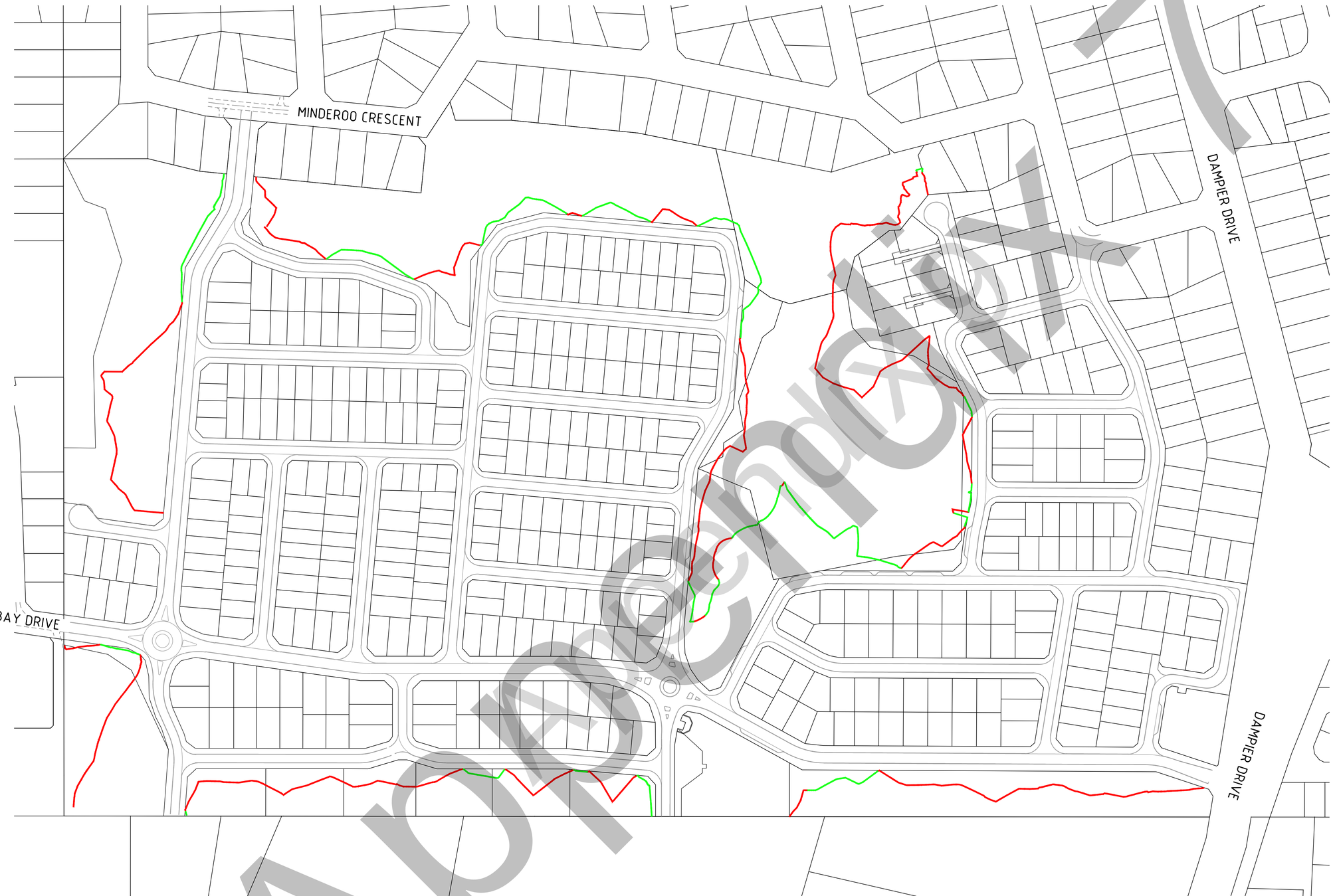
city of Rockingham
where the coast comes to life
PO Box 2142
Rockingham DC,
WA 6169
Telephone (08) 9528 0333
Fax (08) 9592 1705

DESIGNED	NL/CB	--/--/--
DRAWN	CB/PX	--/--/--
CHECKED	NL	--/--/--
APPROVED	ST	--/--/--

DRAWING NO: RSD-521
REVISION: 2

APPENDIX 7

Appendix 9



LEGEND

- BATTER IN CUT
- BATTER IN FILL

APPROVED

REV	DATE	DRN	CKD	APP	AMENDMENT
A	27.07.21	WBR			ISSUED FOR INFORMATION

N

0m 30 60 90
1:1500

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CLIENT
THE DEPARTMENT OF COMMUNITIES & PEET GOLDEN BAY PTY LTD

APPROVED
CHECK PRINT

DESIGNED
WBR

SCALE
1:1500

PROJECT
GOLDEN BAY - LOT 3

TITLE
EXTENT OF CUT AND FILL BATTERS

WAPC No.

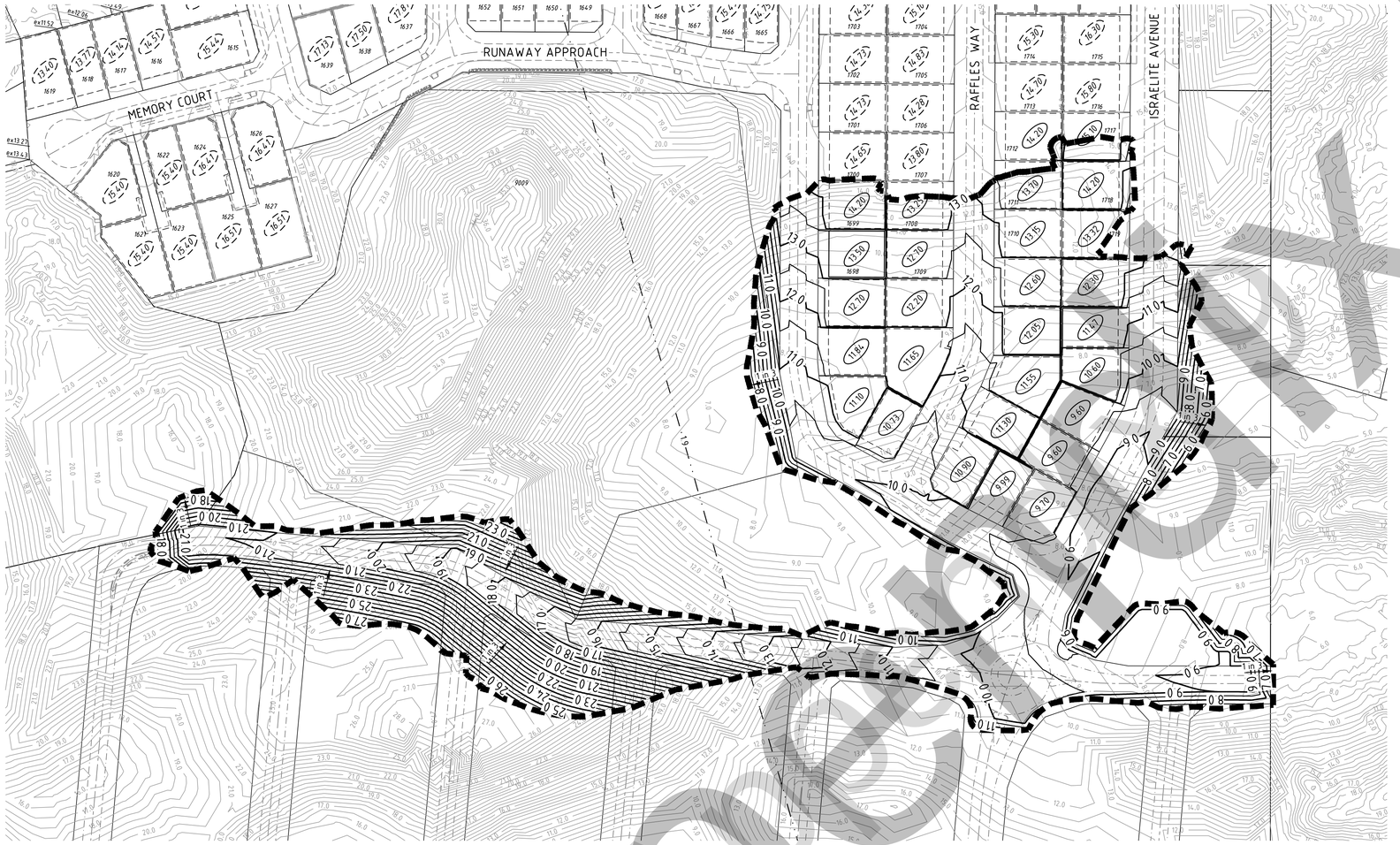
DRAWING No.
5453-LOT3-SK74

REVISION
A

ORIGINAL SIZE
A1

APPROVED

P:\5453 Golden Bay\5453-LOT3\Overall\Acad\Sketches\5453-LOT3-SK74.dwg, 27/07/2021 1:55:43 PM, wayner, Digital Signing PDF.pc3, 1:1, - CW Reference

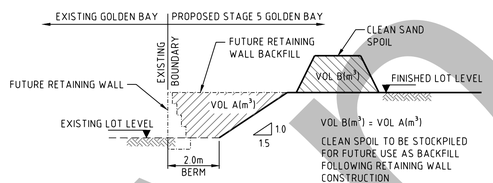


GENERAL NOTES

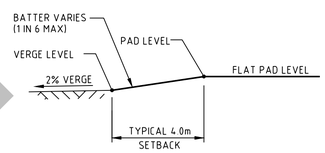
1. ALL LEVELS IN METRES TO AHD. EXISTING SURVEY BY MNG.
2. BATTERS TO EXISTING SURFACE AT 1:3 (CUT) 1:3 (FILL) UNLESS NOTED OTHERWISE.
3. BATTER POSITION FOR FUTURE WALLS TO ENSURE CUT TO FILL EARTHWORKS BALANCE.
4. ALL UNSUITABLE MATERIAL TO BE REMOVED BY THE CONTRACTOR TO APPROVED TIPPING SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL FEES TO BE PAID BY CONTRACTOR.
5. EXTENT OF EARTHWORKS TO BE LIMITED TO THE EARTHWORKS STAGE BOUNDARY UNLESS AGREED WITH THE SUPERINTENDENT.
6. ALL CLEARED MATERIAL TO BE MULCHED AND STOCKPILED ON SITE WHERE INDICATED.
7. CONTRACTOR TO LOCATE ALL EXISTING SERVICES PRIOR TO COMMENCEMENT OF WORKS ON SITE.
8. CONTRACTOR TO GRADE EVENLY BETWEEN DESIGN CONTOURS AND MATCH INTO EXISTING SURFACE AT LIMIT OF EARTHWORKS BOUNDARY WHERE APPROPRIATE.
9. EXCESS CUT FROM EARTHWORKS SHALL BE PLACED ON SITE AS DIRECTED BY THE SUPERINTENDENT.
10. WHERE LIMESTONE IS WITHIN 600mm OF THE FINAL SURFACE LEVEL THE CONTRACTOR SHALL TREAT THE SITE IN ACCORDANCE WITH THE SPECIFICATION.
11. DESIGN LEVELS SHOWN SHALL BE ON THE FINISHED SURFACE INCLUDING TOPSOIL WHERE SPECIFIED.
12. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND PERSONELL TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION AND EXISTING SERVICES ON SITE.

LEGEND

- EXISTING CONTOUR (0.5m)
- DESIGN CONTOUR (0.5m)
- EXISTING LOT PAD LEVEL
- DESIGN LOT PAD LEVEL
- EXISTING NATURAL SURFACE LEVEL
- AAMGL
- EARTHWORKS BOUNDARY



TYP. BATTER AT FUTURE WALL LOCATION TO EXISTING LOTS
N.T.S



TYPICAL BATTER TO FRONT OF TRADITIONAL LOTS
N.T.S

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REV	DATE	DRN	CKD	APP	AMENDMENT
0	04.06.19	WBR	AJP	AJP	ISSUED FOR CONSTRUCTION
A	29.03.19	WBR	AJP	A. THOMSON	ISSUED FOR APPROVAL

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APPROVED: AJP | DESIGNED: WBR | SCALE: 1:1000

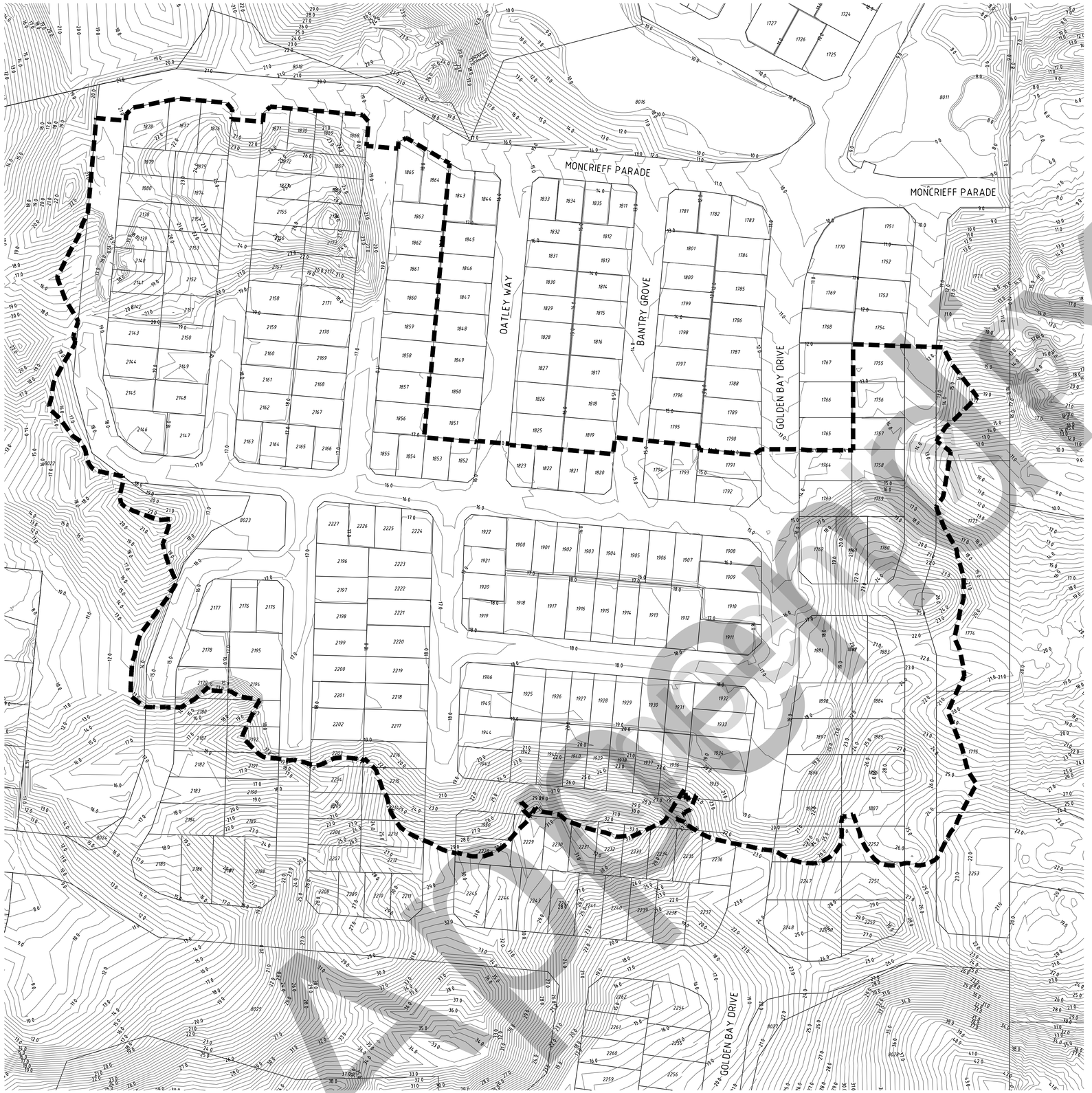
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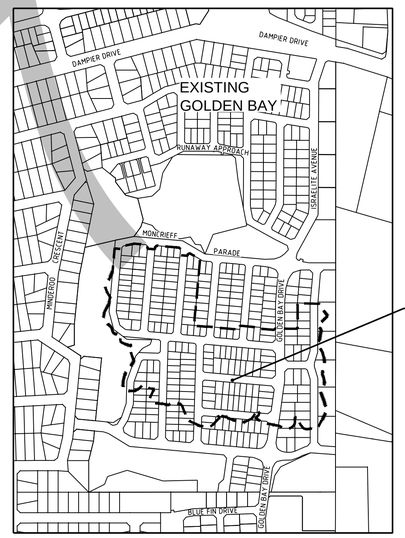
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WAPC No. 154533, 156181 | DRAWING No. 5453-5C-100 | REVISION 0 | ORIGINAL SIZE A1

APPROVED

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LOCALITY PLAN
NTS

LEGEND

20.0 — EXISTING SURFACE CONTOUR (5.0m INTERVAL)

EXTENT OF WORKS

REV	DATE	DRN	CKD	APP	AMENDMENT
A	18.10.21	WBR	AJP		ISSUED FOR INFORMATION

N

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1:1000

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APPROVED: AJP

DESIGNED: WBR

SCALE: 1:1000

PROJECT: GOLDEN BAY - STAGE 5G

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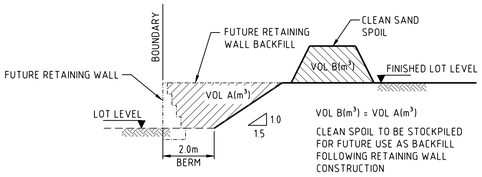
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DRAWING No. 5453-5G-101

REVISION A

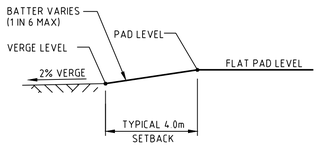
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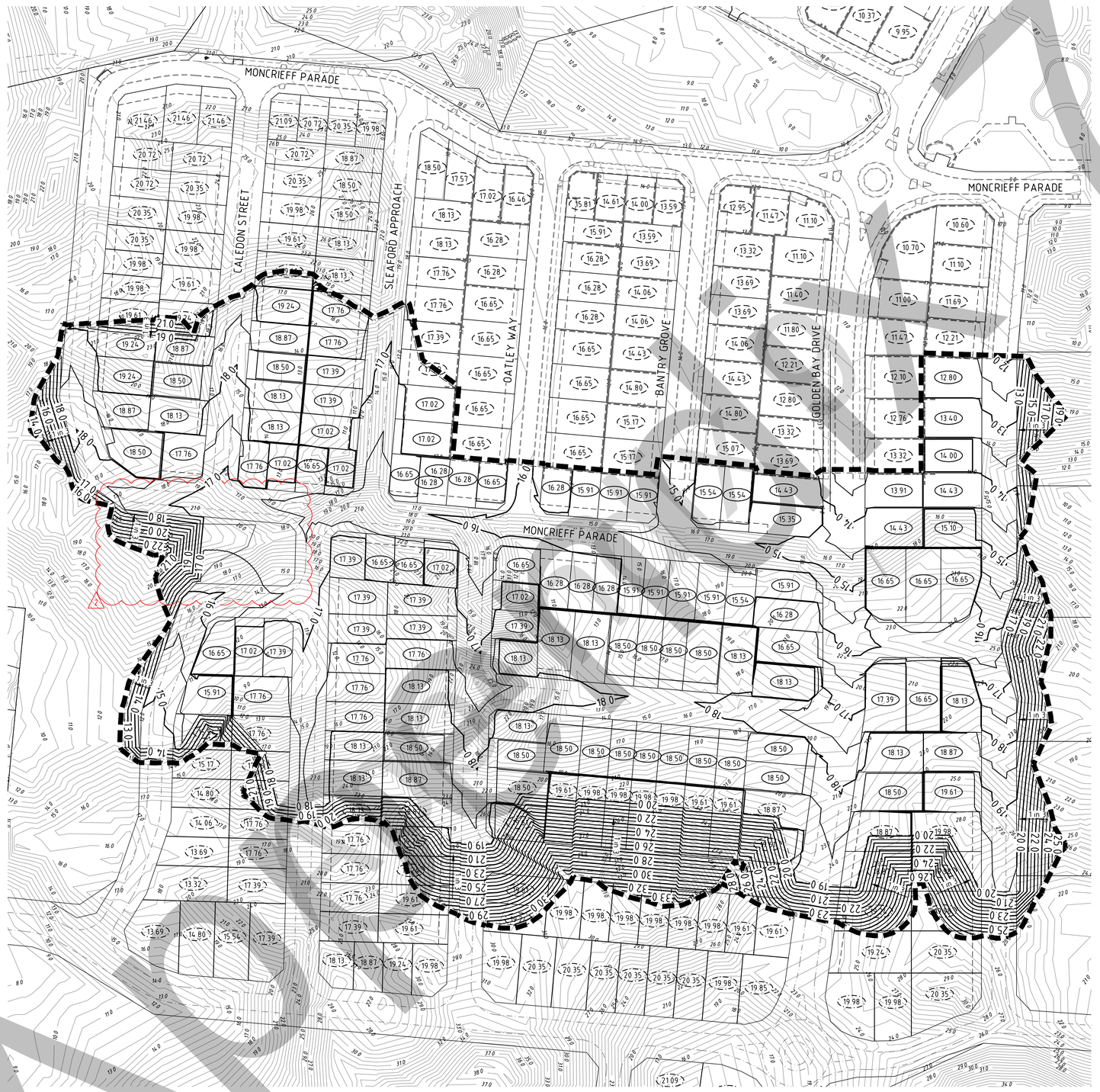
TYP. BATTER AT FUTURE WALL LOCATION

N.T.S



TYPICAL BATTER TO FRONT OF TRADITIONAL LOTS

N.T.S



LEGEND	
DESCRIPTION	SYMBOL
LIMIT OF WORKS BOUNDARY	
FINISHED SURFACE CONTOUR MAJOR	13.0
FINISHED SURFACE CONTOUR MINOR	
EXISTING SURFACE CONTOUR MAJOR	13.0
EXISTING SURFACE CONTOUR MINOR	
EXISTING LOT PAD LEVEL	11.55
FINISHED LOT PAD LEVEL	11.55
FUTURE LOT PAD LEVEL	11.55
EXISTING RETAINING WALL	
BUILDING SETBACK LINE	

NOTES

1. ALL LEVELS IN METRES TO AHD. SURVEY BY MNG.
2. BATTERS TO EXISTING SURFACE AT 1:3 (CUT) 1:3 (FILL) UNLESS NOTED OTHERWISE.
3. BATTER POSITION FOR FUTURE WALLS TO ENSURE CUT TO FILL EARTHWORKS BALANCE.
4. ALL UNSUITABLE MATERIAL TO BE REMOVED BY THE CONTRACTOR TO APPROVED TIPPING SITE PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL FEES TO BE PAID BY CONTRACTOR.
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12. THE CONTRACTOR SHALL LIMIT THE MOVEMENT OF EQUIPMENT AND MANPOWER TO THE MINIMUM AREA NECESSARY AND PROTECT ALL VEGETATION AND EXISTING SERVICES ON SITE.
13. ADJACENT RESIDENTS TO BE NOTIFIED OF THE WORKS AT LEAST TWO WEEKS IN ADVANCE. CONTRACTOR TO PROVIDE MOBILE NUMBER FOR SUPERVISOR AS PART OF NOTIFICATION.

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AS CONSTRUCTED

REV	DATE	DRN	CKD	APP	AMENDMENT
2	27.07.21	WBR	ATP		EARTHWORKS DESIGN REVISED
1	06.07.21	WBR	KP	A. THOMSON	EARTHWORKS BOUNDARY REVISED
0	04.06.21	WBR	AJP	A. THOMSON	ISSUED FOR CONSTRUCTION
A	07.04.21	WBR	AJP	D. SLIEKER	ISSUED FOR APPROVAL

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APPROVED: AJP | DESIGNED: WBR | SCALE: 1:1000

PROJECT: GOLDEN BAY - STAGE 5G

TITLE: BULK EARTHWORKS

WAPC No. 158634 | DRAWING No. 5453-5G-200 | REVISION 2

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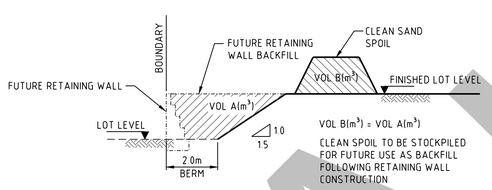
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FINISHED SURFACE CONTOUR MAJOR	13.0
FINISHED SURFACE CONTOUR MINOR	
EXISTING SURFACE CONTOUR MAJOR	13.0
EXISTING SURFACE CONTOUR MINOR	
EXISTING LOT PAD LEVEL	11.55
FINISHED LOT PAD LEVEL	11.55
FUTURE LOT PAD LEVEL	11.55
EXISTING RETAINING WALL	
EXISTING SPOT LEVEL	EX 21.58
BUILDING SETBACK LINE	

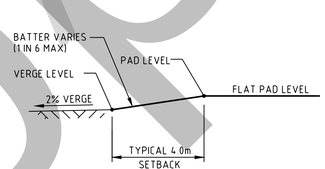
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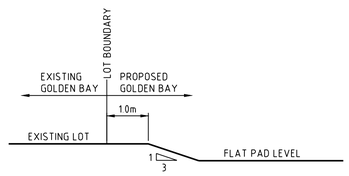




TYP. BATTER AT FUTURE WALL LOCATION
N.T.S



TYPICAL BATTER TO FRONT OF TRADITIONAL LOTS
N.T.S



DETAIL A
BULK EARTHWORKS BATTER WITH EXISTING LOTS
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APPROVED

REV	DATE	DRN	CKD	APP	AMENDMENT
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B	16.03.22	WBR	AJP	A. THOMSON	EXISTING SPOT LEVELS AND DETAIL A ADDED
A	18.02.22	WBR	AJP	A. THOMSON	ISSUED FOR APPROVAL

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APPROVED

DESIGNED: WBR

SCALE: 1:1000

PROJECT: GOLDEN BAY - STAGE 5H

TITLE: BULK EARTHWORKS

WAPC No. 158634

DRAWING No. 5453-5H-200

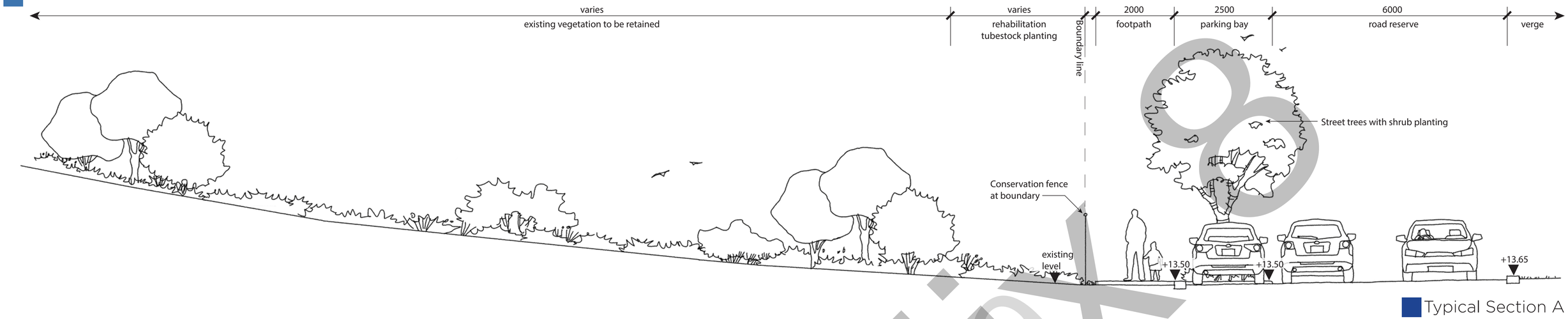
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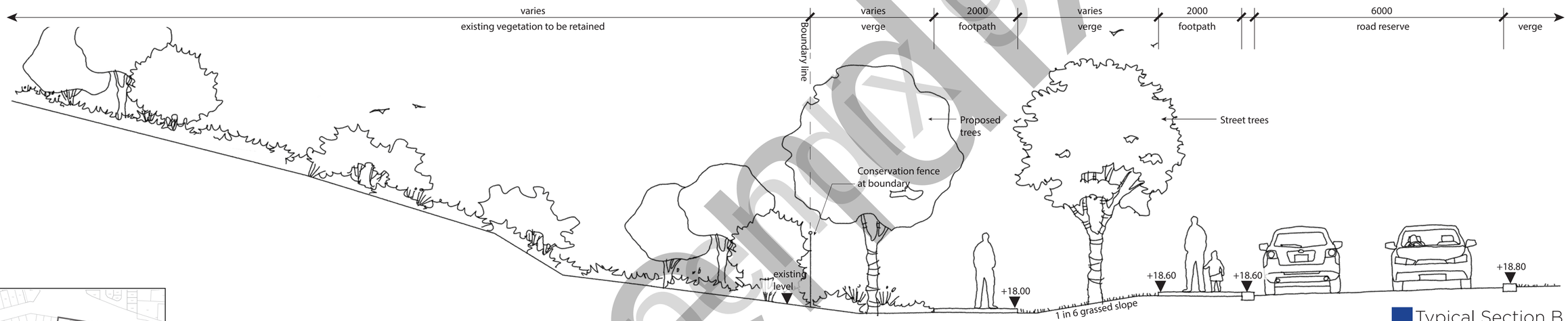
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APPENDIX 8

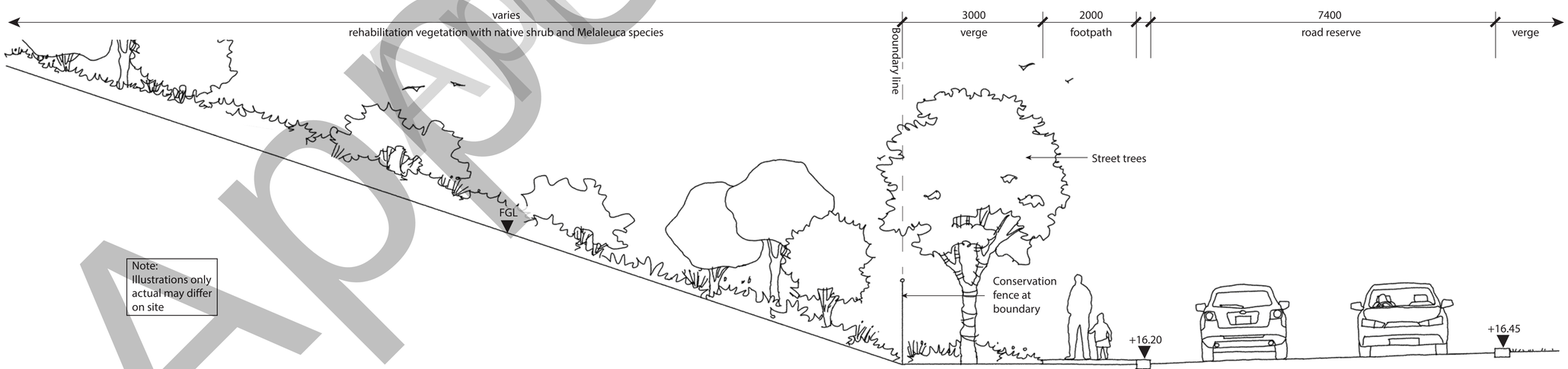
Appendix 9



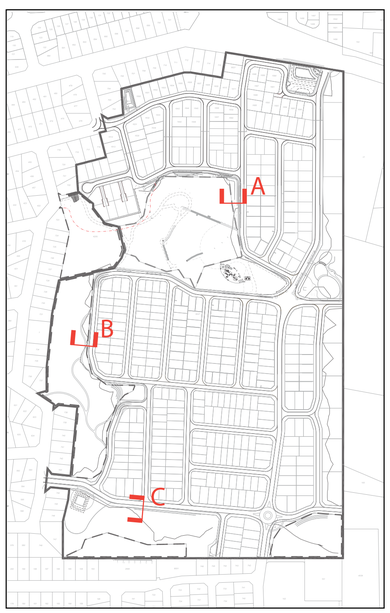
Typical Section A



Typical Section B



Typical Section C



Key Plan

Note:
Illustrations only
actual may differ
on site

Appendix 8

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GOLDEN BAY

Stage 5: Typical sections - Sheet 001

Version 15

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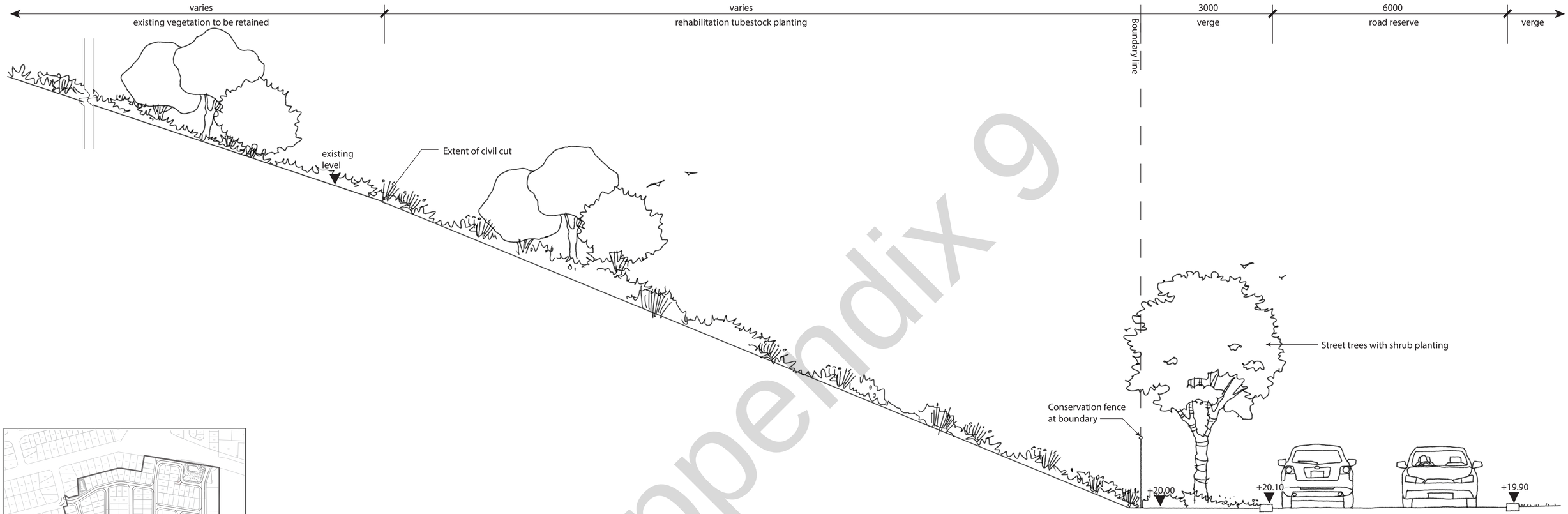
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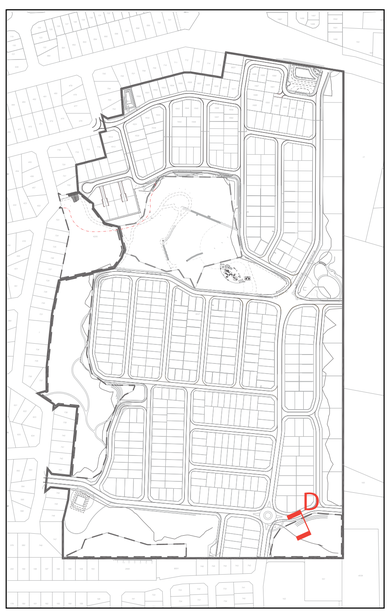
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EPCAD



Typical Section D



Key Plan

Note:
Illustrations only actual may differ on site

Appendix 9

SCALE 1:50

scale : 1 : 50 @ A1 date : 19 July 2023

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APPENDIX 10

FMP ADDENDUM 2

GOLDEN BAY FORESHORE MANAGEMENT PLAN

ADDENDUM 2 – INTERNAL PATH ALIGNMENT

Prepared for:	Peet Golden Bay Pty Ltd
Report Date:	1 May 2024
Version:	2
Report No.	2023-775

pgv ENVIRONMENTAL

CONTENTS

Contents i
List of Attachments ii
1 INTRODUCTION 1
1.1 Background 1
1.2 Site Location 1
1.3 Purpose and Scope 1
1.4 Approval of this Addendum 2
1.4.1 Consultation 2
2 FORESHORE RESERVE PLAN 3
2.1 Access 3
2.2 Beach Access Paths 3
2.3 Fencing 3
2.4 Fauna Management 4
2.5 Public Access 4
2.6 2.6 Rehabilitation 4
2.7 Foreshore Reserve Concept Plan 4
3 CONCLUSION 5

Appendix 10

LIST OF ATTACHMENTS

Attachments

Attachment 1: Foreshore Reserve Management Proposal (Version 16)

Attachment 2: City of Rockingham Endorsement of this Addendum

Appendix 10

1 INTRODUCTION

1.1 Background

Western Australian Land Authority as agent of the Housing Authority (trading as DevelopmentWA) and Peet Golden Bay Pty Ltd are developing Lot 2 Warnbro Sound Avenue and Lot 3 Dampier Drive, Golden Bay for residential purposes. The development of the western portion of Lot 2 Warnbro Sound Avenue required the preparation of a Foreshore Reserve under Condition 3 of Ministerial Statement 297 (Appendix 1). Proponent Commitment 2 in Ministerial Statement 297 required the preparation of a Foreshore Management Plan (FMP), which was completed by PGV Environmental in 2011 and approved by the Environmental Protection Authority (EPA) on 30 March 2012 following endorsement from the City of Rockingham (City) and Department of Planning (DoP) (Appendix 2).

1.2 Site Location

The Foreshore Reserve (the site) is located approximately 50km south of Perth and 16km south of Rockingham Town Centre, within the City of Rockingham. The site is bound by Secret Harbour to the north, the Lot 2 Golden Bay development to the east, the existing Golden Bay Township to the south and the high water mark of the Indian Ocean to the west.

The site covers an area of approximately 10.61ha. It is 800m in length and incorporates the fore dune and near-coastal dune systems. The width of the Foreshore Reserve ranges between approximately 150m (southern end), 156m (northern end) and 300m (centre).

1.3 Purpose and Scope

The purpose of this Addendum to the Golden Bay FMP is to remove the two east west oriented internal walk paths from the central section and the three paths in the northern section of the conservation area. The developer has reviewed the internal walk paths with the City of Rockingham, and it was determined that the internal walk paths were not required for local residents to access the beach. The dual use paths adjacent to Marillana Drive are considered to provide adequate beach access for local residents (Attachment 1).

The original internal path system as identified in the FMP (2016) was to be formalised along existing tracks. In the ensuring years these tracks have been overgrown with native vegetation that would require clearing for the formalisation of the path system. From an environmental perspective, removing the internal paths is a better outcome for the coastal vegetation, TECs, wetlands and Quenda. The caveat to this statement however is dependent on residents not making their own way through the conservation area which would be detrimental to the conservation area and its environmental values. The likelihood of residents making their own way through the conservation area is relatively low due to the dense vegetation and that access is impeded by steep batters along the interface with the development. The central section of the foreshore reserve will be fenced to prevent unauthorised access.

Signage will be placed along the interface detailing the environmental values in the foreshore reserve and that access to the beach is provided through dual use paths adjacent to Marillana Drive. Signage

Appendix 10

could be include detailing the risk of snakes in the foreshore reserve and that residents should keep to designated paths.

This addendum will replace the following sections of the FMP:

- 7.5 Access
- 7.5.2 Beach Access Path
- 7.5.6 Fencing
- 8.1.1 Fauna Management
- 8.2.2 Public Access
- 8.3.1 Rehabilitation Areas
- Figure 2

1.4 Approval of this Addendum

The City of Rockingham have supported the revised Foreshore Concept Design. The Department of Planning, Lands and Heritage have been advised of the path realignment. This Addendum will be provided to the Department of Water Environment and Regulation (DWER) for their endorsement.

1.4.1 Consultation

Peet and the City of Rockingham met on 16 February 2023 to discuss the coastal pathways and potential linkages within the Foreshore Reserve between Marillana Drive and Shipwreck Cove. The two formalised pedestrian pathways through the central foreshore reserve, proposed in the amended Foreshore Management Plan in 2016, present concerns with regards to the increased vegetation density and possible impacts to environmental values through increased pedestrian access. Vegetation clearing would now be required to construct the paths in the central foreshore reserve. It was also noted that the southern-most proposed path, traverses Registered Aboriginal Heritage Site 3519, was not appropriate due to potential impacts to the Registered Site.

The removal of the internal paths in the central foreshore reserve was presented to the City of Rockingham Council at the June 2023 Council Meeting and was endorsed, refer to Committee Minutes in Attachment 2.

Appendix 10

2 FORESHORE RESERVE PLAN

The following sections replace the relevant sections in the approved FMP.

2.1 Access

This section replaces section 7.5 of the approved FMP.

Dual use paths (north-south and east-west) have been formalised adjacent to the beach access road.

Public access to the centre foreshore reserve behind the coastal node will be restricted (fenced) to protect the environmental values associated with the area. Informal tracks within the Foreshore Reserve will be rehabilitated and/or allowed to regenerate.

2.2 Beach Access Paths

This section replaces 7.5.1 of the approved FMP.

One dual use path will be constructed adjacent to the beach access road in accordance with City of Rockingham specifications (Attachment 2). Bituminised DUPs are proposed with the following specifications:

- 2.4m width of concrete;
- 0.5m compacted limestone shoulder; and
- Limestone shoulders constructed to a depth of 0.2m with the grade of limestone to be determined on topography.

This section replaces 7.5.2 of the approved FMP.

Six beach (4 existing 2 new) access paths are proposed (Attachment 1) with the following specifications:

- Constructed of bituminised stabilised limestone, stopping 3m short of the beach vegetation line;
- 2m wide with the limestone extending fence to fence; and
- Limestone is to be provided at no less than 200mm in depth to total height 2.5m.

Access path locations will be provided incrementally along the length of the Foreshore Reserve. An access path will stem from each proposed car park and the coastal nodes providing access from these areas to the beach at an easy walking distance of no more than 50m. Walking distance along access paths to the beach from the eastern most DUP is no more than 100m.

2.3 Fencing

This section will be removed from 7.5.6 of the approved FMP.

<u>Dual Use and Beach Access Paths</u>

Appendix 10

Generally, a 900mm PVC chain mesh wire fence with two top wires at a minimum total height of 1.2 metres is required for these paths. In addition, a top rail in place of the two strand wires is a preferred standard.

However, in the case of the Foreshore Reserve for Lots 2 and 3, potential animal movement (Bandicoots) would be impacted by chain mesh wire fence and an appropriate alternative is proposed. Suitable fencing edging the crushed limestone wetland walks is required to enable movement of this fauna species across paths. CCA treated pine or timber posts with a minimum diameter of 150mm, a minimum length of 2.1m and with three strands of SITA wire (a plastic coasted wire with no metal wire in the middle of it) linking each post will be installed in conservation areas.

It is unlikely that the Bandicoots will venture too far out of their natural habitat area (dense, low lying vegetation within the western portion of the Foreshore Reserve). For this reason, it is unlikely that Bandicoots would traverse the DUPs. Nonetheless, this type of fencing will be used throughout to enable fauna access across parts of the DUPs that intersect potential habitat vegetation and to maintain visual consistency in the overall design

2.4 Fauna Management

Removed the following dot pots from section 8.1.1 as they are no longer required due to the internal paths being removed from the concept design.

- Construction of fences on access tracks within the Bandicoot habitat areas that allow Bandicoots to pass under them;
- Construction of access paths within the Bandicoot habitat areas using predominantly crushed limestone or constructing boardwalks to keep the surface of these paths consistent with surfaces in the natural environment;
- Construct fauna access underpasses (1 underpass for every 20m of DUP) beneath sections of the DUPs and access tracks that pass through Bandicoot habitat areas to ensure these paths (and their shoulders) do not restrict animal movement and minimise the threat from passing bicycles or dogs;

2.5 Public Access

Removed section 8.2.2 as public access into the central foreshore reserve area will be restricted (fenced).

2.6 Rehabilitation

Removed section 8.2.3 as informal track has native vegetation regeneration and path will no longer traverse through this area.

All tracks in the central foreshore reserve will be allowed to regenerate.

2.7 Foreshore Reserve Concept Plan

The Foreshore Reserve Concept Plan has been replaced by Attachment 1 to this Addendum.

Appendix 10

3 CONCLUSION

The Foreshore Management Plan Concept Design changes will provide an overall better environmental outcome for the foreshore reserve. Restricting public access into the central portion of the foreshore reserve will provide better protection for the Quenda, TECs, conservation wetlands and the cultural heritage area.

The City of Rockingham has endorsed the revised path alignment (Attachment 2).

The Department of Planning, Lands and Heritage have been advised of the path re-alignment.

Appendix 10

ATTACHMENT 1

FORESHORE MANAGEMENT CONCEPT DESIGN

Appendix 10

Ensure dual use footpath connects to Secret Harbour footpath network

Existing beach access point with viewing deck within Secret Harbour

Low fuel zones to be maintained to provide buffer to proposed development and reduce fire intensity

Beach access and car park (approx 20 car bays)

Dunes to be protected and retained

Rehabilitate existing fire trail along lot boundary as new road will provide fire and emergency vehicle access and fire break

122m coastal setback calculated on the 2008 vegetation line

30m Building Protection Zone to proposed built form

Location of 1.5 Ha Coastal Node at a 78m setback

Dual use footpath

Beach access and car park (approx 30 car bays)

Existing beach access upgraded for local residents

Retain existing fire trail along lot boundary in southern section

Existing beach access upgraded for local residents

EXISTING SECRET HARBOUR

Footpath connection to northern end of subdivision

Dunes to be protected and retained

Future subdivision subject to detailed design

Existing POS 8009

TEC Wetlands to be protected and retained

Footpath connection along main boulevard and to POS 'I'

Future subdivision subject to detailed design

Dunes to be protected and retained

VEGETATION LINE

2030

25.878 ha

Existing foreshore public open space and beach access

EXISTING GOLDEN BAY

DAMPIER DRIVE

A

B

C

D

NOTE:

Fire mitigation includes low fuel zones, access tracks, and interface treatments to prevent fire intensity and assist fighting fire during occurance.

1.5Ha Coastal Node contains the following but not limited to:

1. Surf Club, Club Rooms / Community Hall, Equipment Storage. Cafe and / or Kiosk to support Surf Club facilities.
2. Public toilet, shower and changing facilities.
3. 120 car parking bays with emergency vehicle access.
4. 4000m² - 5000m² public open space including open grassed areas, coastal plantings, shade structures with seating , bbq's, viewing decks and play equipment.
5. Dual use footpaths and disabled access throughout.

LEGEND

INFRASTRUCTURE:

- Indicative Location of Surf Club/Cafe
- Indicative Location of Public Toilet Block
- Indicative Vehicle Access Network
- Indicative Location of Carparking
- Emergency Vehicle Access to Beach

LANDSCAPING:

- Public Open Space
- Landscape Upgrade or Rehabilitation Planting with Selective Clearing
- Low Fuel Zone
- Dual-use Footpaths Including Bike Paths
- Bitumen Stabilised Limestone Emergency/ Maintenance Vehicle Access Track
- Bitumen Stabilised Limestone Pedestrian Bush Walk Trail (with Fencing and Signage) Location to be Agreed on Site
- New Beach Access Paths (with Fencing)
- Existing Beach Access Paths Upgraded (with Fencing)
- Major Footpath Connections
- Shower, Drink-tap and/or Footwash
- Resting Point with Seating Provided
- Lookout or Viewing Deck with Signage Location to be Agreed on Site

OTHER:

- Emergency Vehicle Access Point into Foreshore Reserve
- TEC Wetland Mapped Locations
- EPA Approved Foreshore Boundary
- Lot 2 Site Boundary
- Aboriginal Heritage Site
- A — Cross Sections - Refer to Foreshore Management Proposal Sections
- Conservation Fence

Appendix

ATTACHMENT 2

CITY OF ROCKINGHAM COUNCIL MINUTES EXTRACT

Appendix 10

Planning and Engineering Services Committee

Council Resolution – En bloc Resolution

Moved Cr Edwards, seconded Cr Jones:

That with the exception of Item PD-023/23, PD-026/23 and AS-010/23, which are to be considered separately, the Officer or Committee Recommendations for Items PD-024/23, PD-025/23, PD-027/23, AS-009/23, AS-011/23 and AS-012/23 be adopted en bloc.

Carried – 11/0

Appendix 10

Planning and Development Services
Strategic Planning and Environment

Reference No & Subject:	**PD-023/23 Proposed Variations to Golden Bay Foreshore Management Plan - Foreshore Path Alignments**
File No:	LUP/246-28
Applicant:	Peet Limited
Owner:	Peet Limited
Author:	Mr Luke Rogers, Coordinator Sustainability and Environment
Other Contributors:	Mrs Rebecca Kenworthy, Environmental Planning Officer Mr Brett Ashby, Manager Strategic Planning and Environment
Date of Committee Meeting:	19 June 2023
Previously before Council:	13 December 2011 (SPE-035/11)
Disclosure of Interest:	
Nature of Council's Role in this Matter:	Advocacy
Site:	Lot 2 Warnbro Sound Avenue and Lot 3 Dampier Drive, Golden Bay
Lot Area:	
Attachments:	
Maps/Diagrams:	1. 2012 Foreshore Management Plan Path Alignments 2. Current Foreshore Management Plan (with 2015 air photo) 3. Pathways outlined in the Foreshore Management Plan Proposed for Removal 4. Alternate beach access connection (northern foreshore) 5. Pathways proposed for removal (northern foreshore) 6. Location of Aboriginal Heritage Site 3519 7. Area of Disturbance – northern path central foreshore reserve 8. Alternate beach access connections (central foreshore reserve) 9. Pathways proposed for removal (central foreshore reserve)



9. Pathways Proposed for Removal (central foreshore reserve)

Voting Requirements

Simple Majority

Officer Recommendation

That Council ***SUPPORTS*** a variation to the Golden Bay Foreshore Management Plan to remove specified paths within the Golden Bay foreshore as outlined in Figure 3 of the Report.

Committee Recommendation

That Council ***SUPPORTS*** a variation to the Golden Bay Foreshore Management Plan to remove specified paths within the Golden Bay foreshore as outlined in Figure 3 of the Report.

Committee Voting (Carried) - 6/0

The Committee's Reason for Varying the Officer's Recommendation

Not Applicable

Implications of the Changes to the Officer's Recommendation

Not Applicable

Council Resolution

Moved Cr Buchan, seconded Cr Schmidt:

That Council ***SUPPORTS*** a variation to the Golden Bay Foreshore Management Plan to remove specified paths within the Golden Bay foreshore as outlined in Figure 3 of the Report.

Carried – 11/0

The Council's Reason for Varying the Committee's Recommendation

Not Applicable

Appendix 10